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LOOKING AHEAD
. . . with the Editor

UTILIZING electric current and a pair of electrodes, a new down-the-hole device permits the accurate determination of a permeability profile for a given well, it aids spotting or locating acid at any desired depth, finds the top of mud or other chemical bridges, relocates tubing bottom and casing points, and determines the location of casing leaks.

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This "Electric Pilot" will be featured in an early issue and its practical application illustrated through solutions of typical problems through use of data thus derived.

☆

The Oil Man's Calendar

MAY	
5- 6	Petroleum Electrical Association, Houston.
6- 8	American Institute of Mining and Metallurgical Engineers, Petroleum Division, Adolphus Hotel, Dallas, Texas.
7- 8	Independent Petroleum Association of America, Mid-Year Meeting, Jefferson Hotel, St. Louis, Missouri.
20-21	A.P.I. Mid-Continent Section, Production Division, Tulsa.
24-25	Joint Production and Chemical Committee Conference, Sponsored by Technical Section of American Gas Association, Hotel Pennsylvania, New York.

THE OIL WEEKLY

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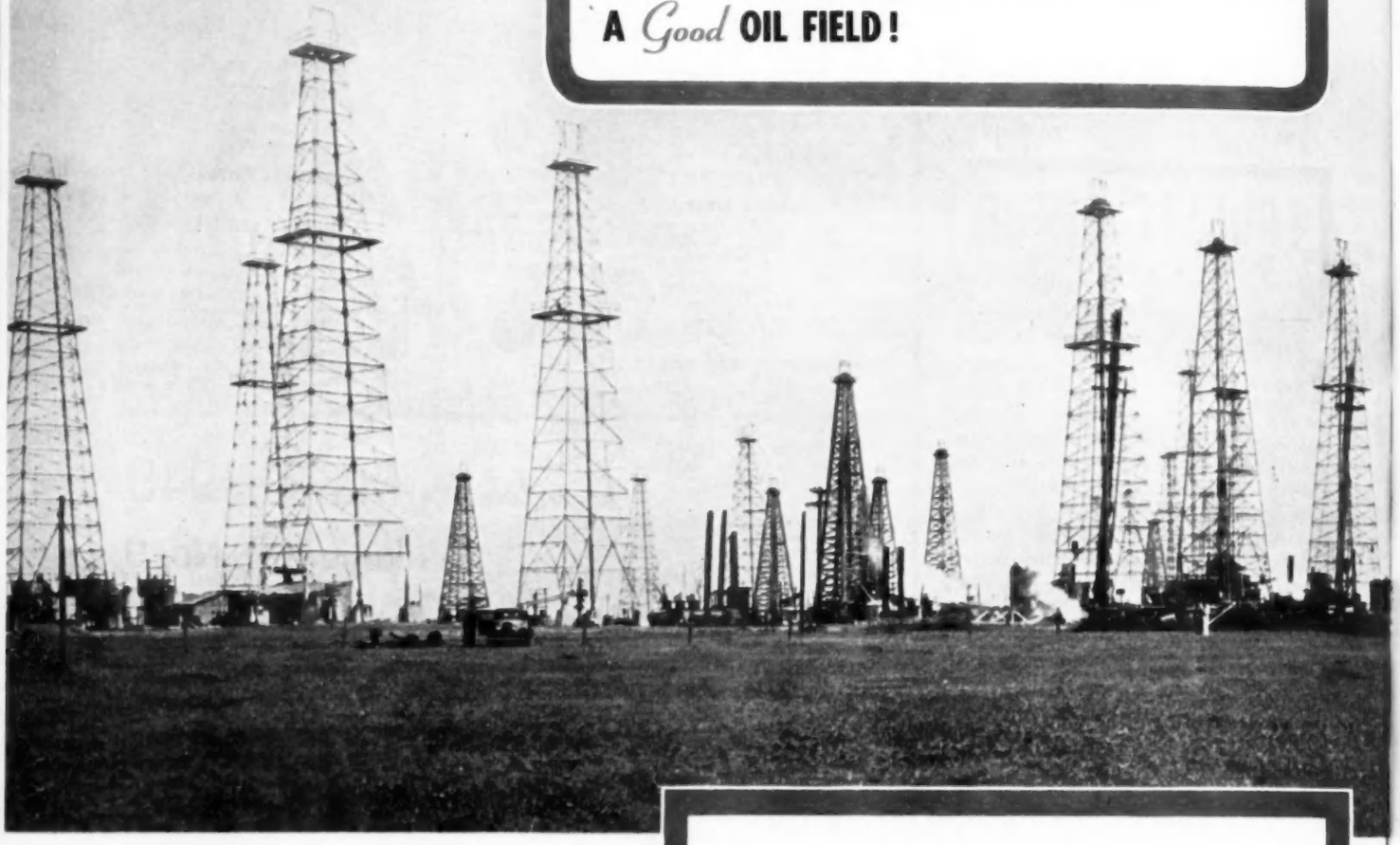
A *Good* OIL WELL . . . . AND
A *Good* OIL WELL IS THE FOUNDATION OF
A *Good* OIL FIELD!



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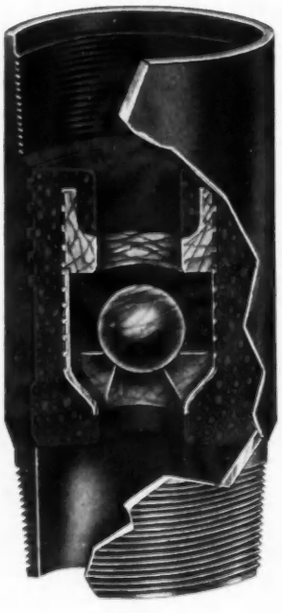

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The Changing Panorama

Government Wants a Profit When It Sells

WHAT must be sauce for private industry is an inedible dish for the government in its own business activities. Whereas the oil industry might be inviting disaster if it sought to hold inventories of oils off the market, awaiting prices it considered essential and just, the government itself has insisted on receiving profitable prices for materials in its hands.

OPA has removed the ceiling price on corn insofar as the Commodity Credit Corporation is concerned. CCC had been prohibited, by provision of an agriculture department appropriation bill, from selling grains at less than parity prices, except for livestock feed or alcohol production. But the ceiling prices on corn as set by OPA were 6½ cents below parity, as calculated by the agriculture department.

Therefore, OPA lifted ceilings on corn sales by CCC, explaining that the action was necessary to provide supplies for corn processors, who would have been unable to continue operations unless further supplies were made available.

Around 2,000,000 bushels of corn had been held off the market, apparently in the hope that ceilings would be raised and higher prices made available.

PAW'S Personnel Valuable Asset

NO ONE can study the personnel of PAW, either in Washington or out in the various districts in the oil country without feeling that an excellent job of selection has been done. With rare exceptions—we can think of only one outstanding one—the men chosen to do the work to which PAW is dedicated, are sound, hard-working, straightforward, experienced men. This happy selection of personnel has been marked in PAW since the days of the first organization of its predecessor, OPC. Result . . . the oil industry, in face of disruption of its normal existence by steel and manpower shortages, by rationing, by tanker sinkings, etc., not to mention some sharpshooting by poorly informed or downright antagonistic commentators, columnists and politicians, has done a splendid job.

We regret the recent resignations from PAW of some of the country's outstanding men . . . men who had stood the sacrifice of forgetting their own business interests until they were forced to return to private life, but we are confident that their successors will be competent and faithful.

Jeffers and Patterson

WHEN Undersecretary of War Patterson accused Rubber Administrator Jeffers of obstructing the war effort in carrying on his job of producing and handling rubber, the Undersecretary forgot one very important thing: Jeffers was given a set of orders by his commander-in-chief, orders with which the entire American public is or can immediately be familiar. He was told to carry out the recommendations the Baruch report made to the President. His instructions have not changed since he was given them. Jeffers is an old-time railroader. He takes his orders seriously. Not even for Patterson will he park his train on a side track, unless the order to change the schedule is given by the proper authority. It is too bad that there are not more men like him engaged in directing our war work. Insofar as the oil industry is concerned, we believe that it will give him a clean bill of health on the charge of gumming up the aviation-gasoline program. About this, pages could be written. Insofar as his rubber achievements are concerned, we doubt if any war job undertaken under presidential order has moved as far along under as great difficulties.

Okra or Oil?

FROM Wichita Falls THE OIL WEEKLY receives this message: "Fresh okra is selling in the local markets here today at 75 cents per pound. The average weighted price for crude oil in this district is $1.13 per barrel and it is reported that many local oil men are abandoning their wells to go into the okra business. The reason for this is obvious; 4 pounds of okra make one gallon, and for one gallon of okra you can buy 112 gallons of crude oil.

"Something seems to be haywire with our economics."

California Setup Reduces Red Tape

BOILED down to its essentials, last week's PAW order relating to the handling of petroleum affairs in California simply means that the California organization of PAW (composed of California oil men) will administer the oil business in California without going through all the red tape necessary in the past. It means that local men, well acquainted with the situation, can take immediate action. California, with heavy increases in demand, is in a somewhat different situation than the other petroleum areas of the country, and the new set-up should be productive of better results. The rest of the country will watch the California experiment with the greatest interest . . . possibly a pattern may be in the making which will cause PAW'S operations to be less unwieldy for the entire industry.

More Executive Laws Than Congress Makes

THE power of law-making has been transplanted from Congress to the executive branch of government in Washington. "Government agencies," states Frederick C. Crawford, president of the National Association of Manufacturers, "are writing laws we live by at the rate of 45 on an average day. This is 20 times the daily output of laws by Congress. One of these agency regulations ran to more than 300,000 words. The Bible has only about 375,000 words."

This has come about, it is commonly said, as a result of the war, and regimentation by a strong central government is essential in a war emergency. But since the United States has been at war less than 1½ years, how can we account for the fact that "In the decade from 1932 through 1942," as pointed out by Crawford, "almost as many executive orders were issued in our national capital as there were laws enacted by Congress. Our lives were affected by 3565 executive measures, compared to 4300 laws made in the manner established in the Constitution." Therefore, when we look back we see that all this has been coming relentlessly upon us for a period of 10 years. Long before

the war government by men the people did not elect to govern them has been steadily replacing government by the representatives sent to local councils, state assemblies and the Congress.

Bureaucracy has happened here. It was happening before Pearl Harbor. Bureaucracy is a forerunner of totalitarianism. It has always been the strongest instrument in the dictator's bag.

"Is this what we are fighting for?" asks Crawford. "Is there one of us who would like to face our sons when they come home from the filth of foxholes and screaming death and say to them:

"'You've given your blood and guts for democracy. We've changed it to a bureaucracy. Hope you don't mind, m'boy!'"

Post-War May See Use Of Substitute High Cost Oil Sources

IF THE industry's enlarged exploration program is unsuccessful in restoring former rates of finding new reserves of oil, the present trend of substituting coal for industrial and domestic use of fuel oil may continue, and ultimately the United States may be forced to rely on high cost coal and oil-shale deposits as additional sources of liquid fuel.

It is evident that the post-war trend probably will be in the direction of greater conservation of petroleum resources and in their more effective utilization. Wartime progress in the production of high-octane gasoline may lead to its use in improved types of high-compression internal combustion engines designed to give more mileage per gallon.

If prices of motor fuel rise because of decreasing supplies, more attention may be given to secondary recovery from depleted fields and to the application of more expensive refining processes, such as pressure hydrogenation of low-grade crudes. It is probable, also, that the Fischer-Tropsch process will be applied to the conversion of natural gas to gasoline. Large reserves of natural gas are available for such conversion.

If these and other technical developments, together with the conceivable importation of oil from foreign sources, fail to meet demand, prices may advance to the point where the production of liquid fuel from oil shale, coal, lignite and renewable vegetable sources will be economically feasible, although costing three to four times that of making gasoline from petroleum.

Most of the nation's bituminous coals and lignite can be liquefied by the Bergius pressure-hydrogenation process, and all grades of coal can be converted to liquid fuel by way of water gas.

Deposits of oil shale, largely in the Rocky Mountain states, are estimated to contain a potential supply of 92 billion barrels of crude oil, sufficient to maintain the 1941 annual rate of oil production for 65 years.

The ultimate reserves of natural gas cannot be estimated, but the estimated proved reserve as of January 1, 1942, was 85 trillion cubic feet. At the 1941 rate of 2.77 trillion cubic feet of production per year, this amount would last 30 years.

The original reserves of coal and lignite were estimated to have been 3.2 trillion tons, and not more than 2 percent of the original supply of bituminous coal and about 30 percent of the anthracite have been exhausted. Assuming that coal will carry the load if and when oil, gas and oil shales are exhausted, we would still have a coal supply for some 500 years.—*From an address by Dr. A. C. Fieldner, chief of the fuels and explosives service of the Bureau of Mines.*

Public Transits Are Being Overburdened

CURTAILMENT of private automobile use, which in normal times accounted for approximately 90 percent of the annual passenger mileage, has put Americans back on trains, busses and trolleys in such large numbers that these public transit systems are threatened with prospects of being overburdened to the point they will collapse.

With few exceptions the nation's transportation equipment is being used close to its limits. Meanwhile, railroad equipment, busses and private automobiles are wearing out. Few replacements are being made.

Only in 1920 did more Americans ride on trains than in 1942, and in the earlier year the average trip was considerably shorter. The 54 million passenger-miles traveled by Americans on trains in 1942 was an all-time peak. This great travel took place on railroads equipped with two-thirds as many passenger cars and half as many locomotives as 20 years before. The heaviest gain took place toward the end of 1942; in October railroad travel was up 130 percent over October of 1941; in November, 143 percent over the previous November.

Inter-city busses in 1942 carried 635,928,703 passengers, an increase of 80 percent over the 376,833,000 of 1941.

However, it is in the field of local transportation—getting to and from jobs—that the most serious wartime passenger transportation situation exists. Figures on increased use of city transportation systems are staggering. As compared with December, 1938, the number of passengers riding Detroit's city system was up 76.9 percent last December, while Baltimore was up 90 percent and Washington 131 percent. These figures shrink, however, when placed beside those for medium size and smaller cities with war plants. Passenger transportation in Charleston, S. C., was up 622 percent, in Wilmington, N. C., 522 percent, and in San Diego, 336 percent. The list is endless.

Because trolleys have become increasingly few during the past 10 years, the crowds have jammed the bus lines chiefly. For 1943, WPB has approved 3000 new busses. In normal years, 15,000 new busses would be constructed.

Despite the growth in use of intra-city and inter-city public systems, the private automobile is still the backbone of the nation's passenger transportation. Surveys at war plants show that 50 to 85 percent of these workers are still using private automobiles to get to work. Meanwhile, the outlook for private automobile travel is far from bright. Over two million cars are estimated to be laid up. The country now has only 215,000 unsold new cars, which in normal times sold at the rate of 10,000 a day. These are our last replacements. There is a heavy demand for used cars. However, dealers have only an estimated 350,000 used cars, a small stock by any previous stand, and they move rapidly; a complete turnover taking place every 60 days, and each time the quality is reduced appreciably.

Because the United States is so dependent on easy transportation, to move goods and get people back and forth to work, some means must be found that will permit not only our railroads, busses, trucks to keeping operating, but also to maintain a very large percent of the privately-owned automobiles.

"The example of four Presidents voluntarily retiring at the end of their eighth year, and the progress of public opinion, that the principle is salutary, have given it in practice the force of precedent and usage; insomuch, that, should a President consent to be a candidate for a third election, I trust he would be rejected, on this demonstration of ambitious views."—Written by Thomas Jefferson in 1821.

Development and Control Of Oil Reservoirs

By S. E. BUCKLEY AND R. C. CRAZE
Humble Oil & Refining Company

THERE now exists a well-developed science of oil reservoir engineering. Present-day thought on the subject is best summarized in the booklet "Standards of Allocation of Oil Production" published in 1942 by the Special Study Committee and Legal Advisory Committee on Well Spacing and Allocation of Production of the American Petroleum Institute. The conclusions stated in this book were reached after years of study of all types of fields by competent technologists of wide and varied experience.

The conclusions of this group form the foundation for this paper, which is not meant to be technical, but is directed to the practical interpretation and application of these conclusions. It is appreciated that the technical principles underlying the behavior of oil fields are universal; however, conditions and operating practices differ decidedly from one area to another. Accordingly, the examples cited in this paper have been restricted primarily to oil fields in the southwestern part of the United States.

Presented before Southwestern District meeting of American Petroleum Institute Division of Production, held at Houston, Texas, April 29-30, 1943.

PARTLY for convenience, partly because such categories sometimes provide approximate rules of thumb for guidance, and finally because the terms are descriptive and suggestive, technologists have classified oil fields according to the following categories:

1. Dissolved gas drive.
2. Gas cap drive.
3. Water drive.

These are not meaningless phrases. The word *drive* is highly significant. It implies what often is overlooked, i.e., that oil lacks any inherent ability to expell itself from the sand or to flow into a well. It must be driven. The agent, gas or water, employed in the expulsion characterizes the drive.

The question may well be raised as to whether these classifications have real or practical significance, and if they do, the conditions which determine the type of drive. The distinction is not academic. The type of drive fixes the operating characteristics and to a large extent determines the ultimate recovery. The conditions which determine the type of drive are many. They may be understood and appreciated better after examination of the characteristics of each type.

Dissolved Gas Drive

The most significant characteristics of the dissolved gas drive are as follows:

1. The reservoir pressure declines continuously as oil is produced. Abandonment occurs when the remaining available pressure differential between the reservoir and the well bore is no longer sufficient to cause the production of oil in commercial quantities.

As a consequence of the pressure decline, only a fraction of the production flows; the remainder must be pumped.

If the field is produced at capacity, the rate of production declines continuously after development is substantially complete. The decline may set in long before all wells are drilled and first becomes apparent in declining well potentials.

2. The gas-oil ratio may be low initially, but soon thereafter it rises, eventually passes through a maximum at which it has several times the initial value, and thereafter declines. The rise in gas-oil ratio is not confined to wells near the crest of the structure, but occurs in all wells, regardless of their location and method of completion. The gas-oil ratio cannot be reduced by ordinary remedial operations such as cementing off the upper part of the exposed formation.

3. Comparatively little water is produced at any stage of the operations.

4. The ultimate oil recovery ranges usually from 10 percent—40 percent of the original oil in place.

As a direct consequence of the low oil recovery, there usually remains in the sand after primary exhaustion an appreciable quantity of oil. This oil can be recovered only by secondary recovery operations, which often involve expenses exceeding the original development costs.

A direct measure of the fractional oil recovery in this type of operation is afforded by the gas production. Unfortunately, records of gas production are not available in many fields. However, where such records are available, they disclose that exhaustion of the field results when substantially the entire original gas content of the reservoir has been produced. Stated differently, all of the oil remaining in the reservoir, as

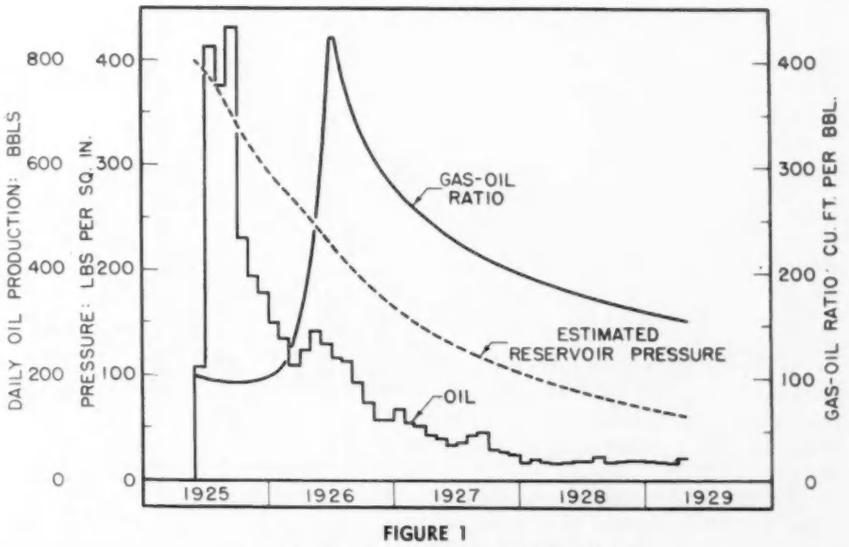


FIGURE 1
Operating Data—Dissolved Gas Drive Field

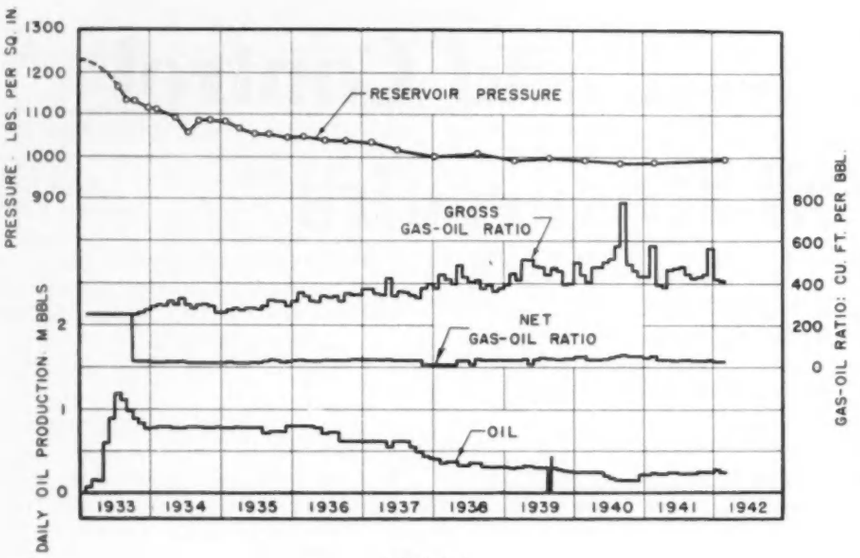


FIGURE 2
Operating Data—Field With Gas Drive

well as that produced, is denuded of its gas. Thus, even in a field containing no free gas cap originally, the total gas production under this type of operation invariably greatly exceeds the amount originally dissolved in the produced oil.

Figure 1 illustrates the rapid rise and decline of the rate of oil production, the variation of gas-oil ratio, and the estimated decline in reservoir pressure in a typical field produced by dissolved gas drive under substantially wide-open flow.

Gas Cap Drive

The gas cap drive is the operation under which a distinct free gas area in the upper part of a structure is permitted or caused to expand, to encroach into the oil zone, and to displace oil down-dip.

Its chief characteristics are as follows:

1. Substantially all of the free gas in the reservoir is segregated as a free gas cap.

2. The reservoir pressure may decline with production, but it declines at a less rapid rate than in the case of the dissolved gas drive and trends during the major part of the life of the field toward an abandonment pressure considerably higher than zero.

3. The gas-oil ratio of wells situated close to the gas-oil contact rises continuously until these wells produce substantially dry gas. Wells downdip continue to produce at low gas-oil ratio until they are reached by the expanding gas front.

4. Wells may be flowed naturally during most of the life of the operations and sometimes to exhaustion.

5. Little or no water is produced at any time.

6. The ultimate production may be expected greatly to exceed that obtained by dissolved gas drive, and under favorable conditions may reach 80 percent of the original oil in place.

Figure 2 shows typical operating data for a field in which substantially all produced gas is being returned to the producing formation at the crest of the structure to form a free gas cap. The slow decline in reservoir pressure is typical of this type of operation. The slow rise in gas-oil ratio is evidence of the effective segregation of the injected gas.

Water Drive

A water drive occurs as the result of edge and bottom water encroachment into the oil zone. Its characteristics are as follows:

1. The reservoir pressure remains at a high level throughout the course of production, never reaching zero.

2. The gas-oil ratio, except in the case of wells improperly completed or completed too close to a free gas cap, remains low throughout the course of production.

3. Appreciable quantities of water usually are produced fairly early in the operations.

4. Most wells flow naturally so long as they are water-free.

5. Wells producing water may require kicking-off with gas, small tubing, or other aids to maintain natural flow, and finally gas-lift or pumping.

6. Oil recoveries from natural water drive fields are expected to be high, ranging usually from 60-80 percent of the oil originally in place. Proper exhaustion of a field by water drive leaves no recoverable oil for secondary operations.

Operating data for a typical water drive field are shown in Figure 3. The high degree of pressure maintenance, low gas-oil ratio, and increasing water production are all characteristic of this type of operation.

Comparison of the Three Types of Drive

Table 1 summarizes the principal distinguishing features of the three types of drive.

Comparative reservoir pressure declines under the three types of drive are illustrated in Figure 4 and gas-oil ratio variations in Figure 5.

It is readily apparent that there is one predominant feature which sets the dissolved gas drive apart from the other two. This feature is illustrated in Figure 6, in which an oil zone is pictured in its original condition, 50 percent depleted, and 90 percent depleted under each drive. It may be seen that in the dissolved gas drive the oil zone is *depleted*, i.e., it is a depletion process. More correctly, it is the gas that is de-

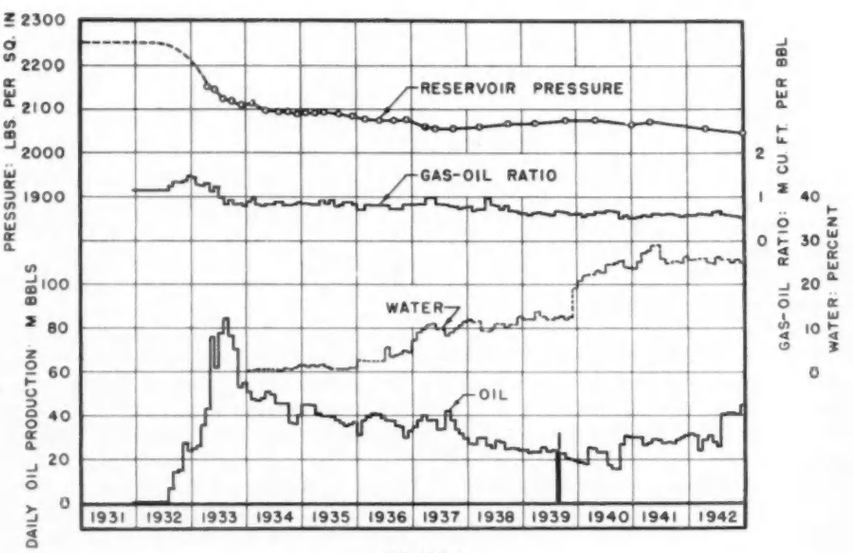


FIGURE 3
Operating Data—Water Drive Field

TABLE 1
Summary of Characteristics of Different Drives

ITEM	Dissolved Gas Drive	Gas Cap Drive	Water Drive
Reservoir pressure	Falls continuously	Falls slowly	Remains high
Gas-oil ratio	Rises to a maximum and then falls in all wells	Rises continuously in up-structure wells	Remains low in all wells
Water production	Absent or negligible	Absent or negligible	Appreciable, continuously increasing
Behavior of wells	Require pumping at an early stage	Flow indefinitely	Flow until water production excessive
Recovery expectancy, percent of original oil in place	10-40%	30-80%	60-80%

pleted, leaving the major part of the oil behind. The oil zone retains its original size and shape and the final oil and gas saturation is dispersed substantially uniformly throughout the zone. In the case of the other two drives, the oil zone is not depleted in the same manner. It is more descriptive to consider the oil zone as having shrunk. There remains until exhaustion an oil zone having substantially the original oil saturation and its original characteristics except that a part of the zone progressively disappears as it is invaded by gas or water.

The differences thus dwindle down to those between a *depletion* mechanism and a *displacement* mechanism. The depletion mechanism gives low oil recovery; the two displacement mechanisms give high recovery. Therein lies the reason for reservoir engineering. The objective is to avoid the one mechanism and bring about the other.

In practice the behavior of an oil field is not so simple as here illustrated. The foregoing describes the extreme of each type of drive. Most oil fields operate under a combination of all three drives. For convenience, a field frequently is classified according to the drive which predominates. Proper reservoir operation then becomes that operation which minimizes the effects of a depletion drive and takes maximum advantage of a displacement drive.

We are not concerned here with the scientific explanations of the reasons for the greater ultimate recovery afforded by the displacement drives. The factors involved are adequately covered in the technical literature of the last decade. We are interested here in the problems faced by an operator in recognizing the type of field in which he operates, in planning an intelligent development program, and in the exercise of control over the behavior of the reservoir.

Identification of Drive

Identification of the type of drive as early as possible in the development of a new field is desirable for many reasons. As a practical matter, there is a fair chance of identifying the type of drive even before a new field is discovered, provided the geology of the area is reasonably well known. There is a reasonably good chance after completion of the first well. The producing horizon and its characteristics and the characteristics of the reservoir oil can all be determined or estimated at this time. Comparison of the new discovery with older fields in the same area producing from the same horizon will give significant clues. Still more important, the type of drive may be predicted because it is to a large degree subject to the operator's control.

In the event that the type of drive cannot be determined at the time of discovery of a new field, it may be necessary to produce as much as 5 to 15 percent of the ultimate production before the field can be definitely classified.

Development Problems in a New Pool

It is highly desirable to develop a new field in such fashion as to take full advantage of and also to afford the fullest possible degree of control of the drive to be used. In the event that the type of drive cannot be determined until development is substantially complete, this situation seems at first glance to offer an enigma. Actually, however, the answer is not as difficult as it might appear to be. In the final analysis, ordinary business prudence and common sense must govern. Mistakes are inevitable, but a few simple precautions may suffice to reduce the effects of any mistakes and also to permit their rectification at reasonable expense. The following covers the main questions involved in development:

[*Continued on page 38*]

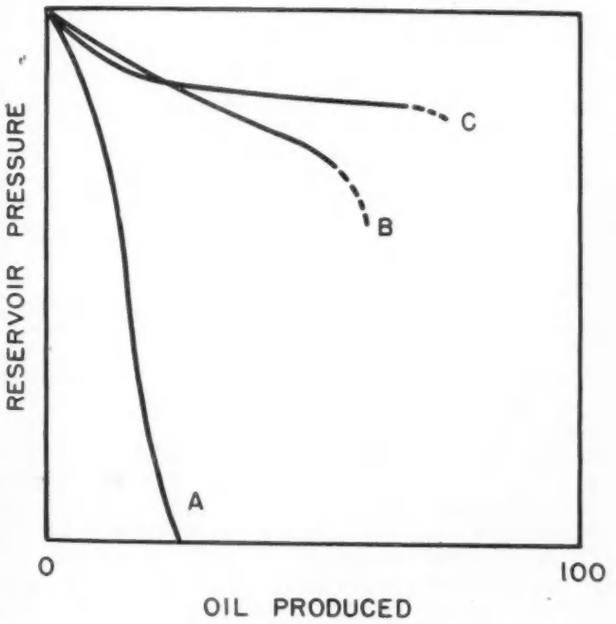


FIGURE 4
Reservoir Pressure Variations Under Different Drives

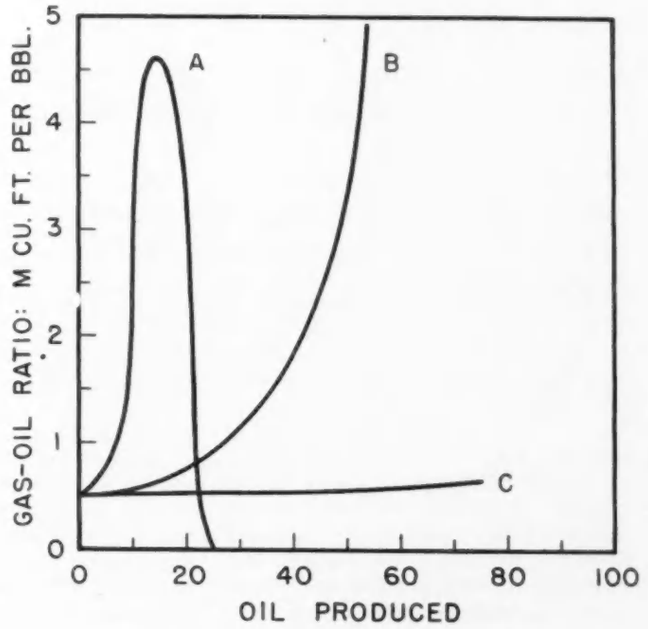


FIGURE 5
Gas-Oil Ratio Variations Under Different Drives

Selective Shooting of Tight Sections Aids Stripper Wells

Procedure gives sand section more uniformity, resulting in speedier oil recovery or greater receptivity to artificial pressures, and lower operating costs

By F. R. COZZENS
Equity Oil & Gas Company

SINCE drilling operations have been curtailed through labor and material shortages, more research and attention is being given old wells, and in various sections of the Eastern stripper fields some outstanding progress is being made by re-shooting of wells. This is made more effective by placing of selective shots in restricted sections of the sand zone that were not affected by the blast used when first completing the well.

Radial Fractures

We know now that shot-hole dimensions are of but minor importance, and that the drainage area of a well depends almost entirely upon the type and length of radical fractures or channels which have been driven into the sand from the blasting point. It is therefore reasonable to assume that in many wells, the tight zones of productive sands were but scarcely more than scarred, while porous and softer sections were pulverized.

Most of the old wells, reconditioned by selective shooting are located on properties being made ready for secondary recovery, and the initial requirement is an accurate measurement of the entire sand face. A common practice is to measure the sand face with a steel line from the bottom of the shot-hole. When a record of its drilling has been kept, the extent and number of tight or restricted sand zones can be determined with fair accuracy. If no record is available, the objective sand sections can frequently be estimated from the well's previous pumping performance. A better method would be to caliper the sand section of the hole. This would give an accurate profile of the sand face, thus making it possible to definitely determine the depth of all tight sections.

The next step is to fill the hole with ruble rock, gravel or some such material that can be drilled out easily. The hole is filled up to the base of the tight sand section nearest the top of the pay. Tamping is done with the drill, so as to form a packed and even surface. A shell, filled with nitro-glycerine or gelatin, is run and seated on the surface of the packing material. The average nitro-glycerine shell is the common 4½-inch type, allowing 3.4 quarts per each foot of hole. Some operators substitute the less expensive gelatin, 90 percent strength, which seems to give somewhat better results in certain types of sand, especially conglomerate formations. The gelatin cartridges generally used are 4x16 inches, which allows approximately 7.4 pounds for each foot of sand.

Seating Shell

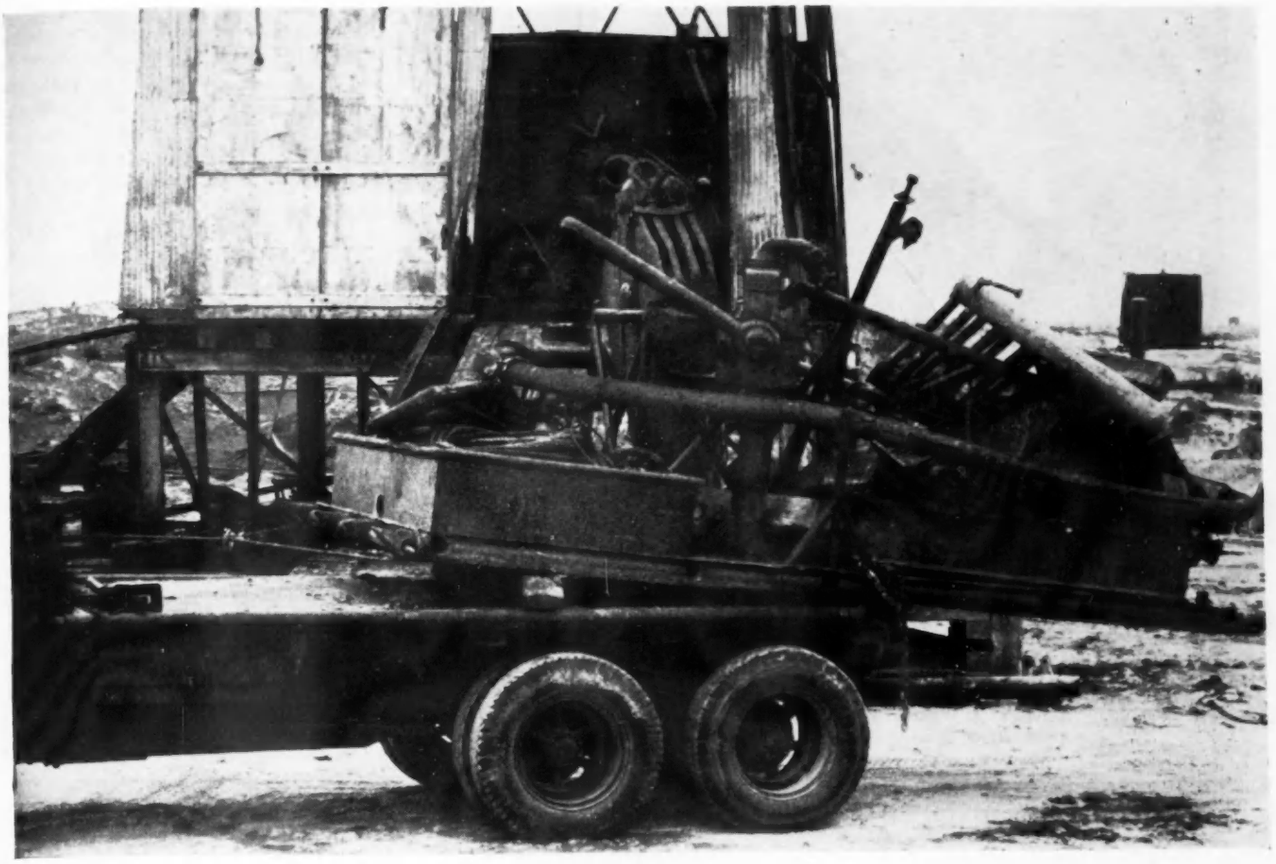
The shells, of course, must be long enough to extend from the bottom to the top of the selected zone. After the loaded shell has been seated properly, so as to prevent its being floated out of position, a heavy anchor or stemming (usually water) is turned into the well, the average amount being one barrel of water to each foot of shell. All shots are of the electric type; blasting cap in shell, and water-proofed connections made to copper wire line which extends up and out of the hole.

After the first restricted sand zone has been "gunned" in this manner, the shot-hole is cleaned out down to the next tight zone, and the same shooting procedure is repeated for each successive tight section. After the final zone has been shot, a general cleaning follows until the bottom of the original shot-hole is reached.

Where conditions are favorable, some operators intensify both the gelatin and nitro-glycerine charges by simultaneous shooting of two or more wells. This process is carried out only when wells are spaced close together (100 to 150 feet apart). The purpose is to create greater and more continuous vibration in the sand section between wells. Results in the majority of cases are quite favorable in hard, flinty and consolidated types of sand.

Comparison of Records

The extent to which the drainage area of a well is increased by selective shooting is readily determined by making comparisons with the well's previous pumping performance. In numerous cases, the output of oil is increased two to five times the production recorded at the date of the selective shooting, which proves that tight and restricted, but otherwise productive sand-zones have been thoroughly fractured while looser zones, "bellied out" by the original shot, are left practically undisturbed. The most important advantage, however, is that all sand zones have been better equalized by selective shooting, thus making the well much more receptive to any kind of artificial force (air, gas, or water) to be used in secondary oil recovery. Results are more speedy recovery of oil, more uniform pressure in the sand body, and lower operating costs. Except when running the shots, the entire reconditioning procedure generally is carried out by two men, and a string of light clean-out tools, and the costs, including explosives, seldom exceeds $200 per well.



Heavy skid, with integral bins and accurately placed and leveled special supporting members, enables simultaneous transportation of complete rig lifting equipment, stored in order to facilitate most expeditious setting up of equipment at new location. Fingerboard sprawled atop traveling block is crew's attempt to bunch equipment, and is a violation of company rules, which specify units and storage order on skid.

Unitized Skid Transports Entire Rig Lifting Setup

Adequate protection against haulage mishaps, together with proper sorting of parts for installation sequence, obtained by specially designed storage unit that also saves much time and physical effort

MANY drilling contractors have worked out effective skids for properly supporting and handling various parts of the drilling equipment during transportation from one job to the next. Most of these units are designed for but one or two parts of the operating equipment, and unless carefully scheduled and routed on trucks, much valuable erection time may be lost while some relatively minor bit of gear is located.

Recognizing the handicaps and shortcomings of the separate skids for various units, one company proceeded with the development of an effective moving skid which would speed up the tearing down, transporting and setting up of heavy, related drilling equipment—in particular the crown block, traveling block, spring hook, swivel and rotary hose.

As finally designed, the unit handles, in a single load, nearly 20,000 pounds of basically related equipment. Experience with the unit has demonstrated that its use saves an average of three hours on the tear-down and set-up time per well. Aside from the saving in time, the physical effort required to handle material is greatly reduced. Certain former operations, such as scotching up the block, (for stringing) and hanging (also re-hanging) the drilling hook is

This sub, welded to the skid platform and rigidly supported in upright position by four webs of heavy steel plate, is typical of manner in which provision is made for adequate protection and support of exposed threaded portions of equipment.

eliminated, and other operations are speeded and simplified because each piece of equipment is held rigidly upright and made easily accessible.

The method of operating is about as follows:

On the tearing-down operation the stripping of the derrick will proceed as usual except that when the standpipe is removed the safety chain on the drilling hose is hooked around a derrick leg and the hose is left hanging there for a while. Stripping completed, the rotary is removed and the moving skid is pulled into the center of the derrick floor—covering the rotary opening and eliminating the necessity for boarding it over. The swivel is picked up and screwed into the rigidly braced stub box.

Rack as Unit

The design of this skid permits the traveling block and hook to be racked as a unit, thus eliminating the necessity for un-hanging (and then re-hanging) the hook. This is done by running the catline through the pulley, tying onto the hook and pulling it into prone position, which action automatically forces the traveling block into a cage where it is locked in an upright position.

The drilling line being un-strung, the crown block is lowered and landed on the unit where it is held in position by lugs welded to the unit frame. The bins are filled, the rotary hose is lowered and coiled in the U-shaped stanchions and, lastly, the catline is pulled over and coiled in its compartment. The skid is then moved to the next location and the above procedure reversed.

Weaknesses

Two weaknesses appeared in the original unit constructed and were as follows: (1) Truck drivers and drilling crews would tie onto the rotary hose supports to move the loaded unit, and thus break them off. It was therefore necessary to redesign and strengthen these supports. (2) It was the tendency of drilling crews to load the skid, and then stack every possible loose piece of material on top of it. Since this hazardous practice could not be eliminated by improved design, it had to be curbed by executive order.

Since the material is always stored on the skid in the same order, and the items first needed are placed atop those to be placed later, no double handling or sorting is necessary at the new location.

Rotary Hose

The manner of placing the rotary hose, coiled in the U-shaped supports above the heavy wire-line equipment, makes it easiest and most natural for the crew to lift the hose clear before attempting to move blocks, swivel or hooks. Once picked up, it is likewise easiest to string it in place within the derrick, so as to leave unobstructed subsequent lifts. Being brought within the derrick when the skid is located over the rotary table opening, the hose goes into place on the standpipe without being exposed to the possibility of serious chafing or cramping against derrick girts or braces.

Likewise, having the derrick line properly coiled within its compartment on the skid, no time is lost in rigging up the line for placing the crown block, dragging clear and setting upright the traveling block and, when the string-up is completed, hooking directly to the bail of the swivel.

A detail of the manner in which the supports providing proper segregation of equipment are welded and braced to prevent shifting under heavy loads or possible use as hitching points for truck winch lines. The heavy I-beam support for the hook also serves as guide to retain traveling block bail in proper position to prevent cramping of relatively light line guards when on the truck.

Operating Features of the Katy Gas Cycling Plant

By FRANK G. NOBLE
Humble Oil & Refining Company

RECENT trends in the design of most gas cycling plants have been toward the installation of plants with large gas processing capacity, usually 100 to 200 million cubic feet of gas per day. Considerable study was given to the proper size plant to produce the Katy gas field, and it was concluded that a plant of the oil absorption type with a processing capacity of 275 million cubic feet of gas per day would permit economical processing of the gas over a period of 30 to 40 years.

The plant is designed to process 275 million cubic feet per day of gas from the producing wells, recovering 80 percent of the potential butanes and practically all of the pentane and heavier hydrocarbons. Approximately 235 million cubic feet per day of wet gas will enter the four high-pressure absorbers operating at 1800 pounds per square inch. The absorber residue gas, with a volume of around 210 million cubic feet per day, is to be returned by the gas engine-driven compressor units to the injection wells. The remaining plant capacity is utilized in the processing of gas for delivery to two sales gas transmission systems. The rated capacity for delivery to gas sales is approximately 52 million cubic feet per day; however, the absorption equipment is sized to accommodate a reasonable overload in order to handle peak gas sales demands.

The plant at rated capacity is expected to recover approximately 7500 barrels per day of total products. Stabilization and storage facilities are provided for the separation of (1) butanes, (2) 250° F. end-point gasoline, and (3) heavy distillate, as separate products. The expected production is 1661 barrels per day of butanes, 2689 barrels per day of gasoline and 3164 barrels per day of naphtha and distillate.

Field System

The gathering system is designed to take the unit's gas from 15 producing wells, 3 of which are dual completions. The lines are sized for a maximum daily production of 20 million cubic feet each from the edge wells, 25 million cubic feet each from the other single-sand completions, and 40 million cubic feet from dual completions. To allow for future production from the weaker and lower-pressure wells in the upper sands, the lines are designed for a pressure drop of 200 pounds, assuming 2200 pounds per square inch at the plant and 2400 pounds per square inch at the well meter settings. The gathing system is designed for a working pressure of 2700 pounds per square inch at 130° F.

Each producing well is equipped with a meter setting for metering the gas produced from each sand. For the lower-sand wells there is a single-wing casing and tubing connection with 2-inch adjustable chokes for controlling the flow. For the upper-sand single-completion wells the casing is connected by a double 4-inch wing, and the tubing by a single wing, and the tubing by a single-wing connection, equal in size to the tubing. Each wing has an adjustable choke for controlling the production rate. For dual-completion wells the well-head connections are the same as for the upper-sand wells.

The system for returning gas to the injection-wells is planned so that reasonable distribution control may be maintained. Control of the gas cycling "pattern" will necessitate variations in gas-injection rates to the various wells during the period of operations. The injection field lines are designed so that approximately 50 million cubic feet could be delivered to each injection well with a maximum pressure drop of 100 pounds between the compressors and the injection-well heads. Of this pressure drop, about 25 pounds is due to line losses at the plant, expansion bends, meter setting, and well-head connections.

A comparison was made of the merits of individual lines between the plant and the injection wells as against a large line from the plant to each end of the field with laterals to each injection well. It was found in this particular case that, for a given pressure drop, the individual lines had about 25 percent more capacity required approximately 250 tons less steel, and resulted in a lower installation cost.

The injection field lines are 7⅝-inch O.D. (0.625 inches wall thickness) pipe. The meter setting and pipe within 125 feet of the injection well are 6⅝-inch O.D. (0.718) inches wall thickness) pipe. All piping is designed and constructed in accordance with the ASA Code for High-Pressure Piping, using Grade B seamless pipe. Each injection well has two 4-inch casing and one 2½-inch tubing connection with a check valve installed on each well-head connection. The field lines are securely anchored at each end and between each expansion bend provided in the line. Expansion bends are also installed at the well head to provide for expansion in the well casing. The injection system is designed for a working pressure of 3500 pounds per square inch at 175° F.

High Pressure Gas System Within Plant

Figure 1 illustrates the essential features of the plant process design and is to be referred to in illustrating the various systems involved.

The producing wells, at an average flow rate of 25 million cubic feet per

THE Katy gas field, located approximately 40 miles west of Houston, is situated principally in the southeastern corner of Waller County with its outer limits extending into the southwestern corner of Harris County and the northeastern corner of Fort Bend County, Texas.

In 1939, negotiations were begun with the parties having interests in the Katy gas field for unitization of their properties with the view of installing a cycling plant to process the produced gas and reinjection of the residue gas. Agreements of interested parties regarding basic contracts for the project operation were completed by May, 1941.

After completion of these basic contracts, immediate plans were drawn for installation of a gas-cycling plant, the purpose of which, in addition to the above operations is to recover the essential products of butanes, gasoline, and other hydrocarbon fractions.

This paper was presented before the spring meeting of the Southwestern District, A.P.I. Division of Production, Houston, April 30, 1943.

day each, have a pressure at the well head of approximately 2450 pounds per square inch and a flowing temperature of 165° F. The wet gas arrives at the plant at a pressure of 2200 pounds per square inch and a temperature around 135° F. The gas, to be processed in the high-pressure absorbers and handled through the compressor unit for reinjection to the producing formation, is first cooled in the high-pressure cooling coils located in the cooling tower. Such cooling reduces the gas temperature from 135 to 90° F. at inlet plant pressure. After cooling, the gas is delivered to the 1800-pound system through two headers and pressure-reducing regulators which control the absorber and compressor suction pressures at 1000 pounds per square inch. Before introducing the gas into the four 1800-pound absorbers, it is passed through two separators operating in parallel to remove the liquid formed by previous cooling and pressure reduction. The discussion of this liquid flow will follow under "Condensate Flash and Process System."

Gas from the separators operating at 1800 pounds per square inch is next delivered and equally distributed to four absorbers operating in parallel. Sufficient absorption oil contacts the gas for the extraction, at this point, of 84 percent of the butanes. The residue gas is then passed through two scrubbers in parallel operation where any entrainment or large quantity of liquid that might be carried overhead from the absorbers, due to mechanical "up-set," will be automatically collected and drained. The gas then goes into the compressors for delivery to the injection wells. All gas volumes referred to in this discussion are at a pressure base of 14.7 pounds per square inch, absolute, and 60° F. temperature.

The compressor unit has seven 800-horsepower compressors, each machine consisting of two double-acting horizontal compressor cylinders directly connected to an 8-cylinder power engine operating at 330 rpm. The compressors are installed to deliver 210 million cubic feet per day of high-pressure absorber residue gas to the injection system and wells at a suction pressure of 1800 pounds per square inch and a discharge pressure of 3000 pounds per square inch. A closed-jacket cooling-water system is provided for the unit, the make-up water being condensed steam from the power-plant system. The jacket-water coolers are of the closed shell-and-tube type and are arranged with a by-pass and necessary control equipment to maintain the desired jacket-water temperature. A 100-horsepower electric motor-driven centrifugal pump circulates the required quantity of jacket-cooling water.

Sales Gas System

Facilities for supplying the high-pressure residue gas for sale to the two gas transmission systems located in the field center primarily around the operation of two 800-pound sales gas absorbers and the 600-pound high-pressure reabsorber. A stream of the wet gas from the field is withdrawn up-stream from the high-pressure gas coolers and reduced to 800 pounds per square inch by means of an instrument-operated control valve. Due to pressure drop, the temperature of the gas will be lowered from 135° F. to approximately 80° F. A heater is installed in the line to prevent hydrate formation at low temperatures. The gas, along with the liquid formed by pressure reduction, is next delivered to the sales gas separator where the liquid is removed and the gas passed to the two sales-gas absorbers operating in parallel. Sufficient absorption oil contacts the inlet gas to extract approximately 79 percent of the butanes. The residue gas, after leaving the absorbers, goes to a 600-pound operating pressure reabsorber and with the recompressor discharge vapors, the total gas from this stop-tank then passes through control equipment and into the sales-gas systems. The control scheme of the system is such that either constant gas volume or constant pressure may be maintained on one of the gas systems, while gas delivery to the other system is designed for constant pressure only. A primary pressure-reducing regulator on the high-pressure inlet wet gas floats on the line so as to maintain 800 pounds per square inch on the sales-gas absorbers regardless of the variations in sales gas deliveries.

Reabsorption System

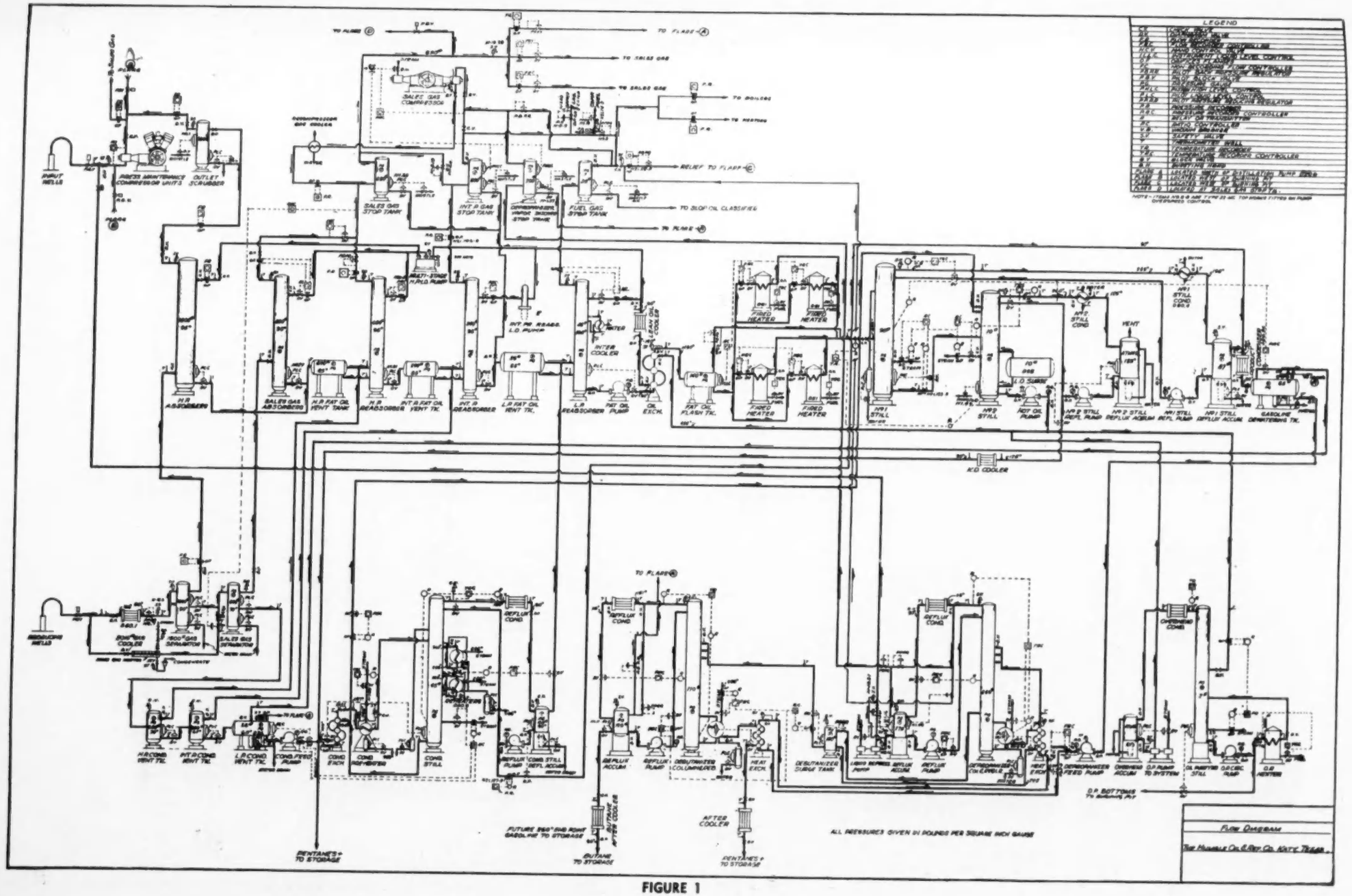
One of the major problems encountered is the design of a process employing a pressure in the primary absorbers of 1800 pounds per square inch is the proper removal of the tremendous quantities (approximately 16,000 mcf per day) of methane and ethane dissolved in the rich oil from the absorbers. The most practical method of eliminating these undesirables, and yet retaining butanes, is by stage reduction of pressures and reabsorption of the desirable hydrocarbons. Careful consideration was given in the design to selection of the optimum pressures for these flashes and reabsorptions. As a result, the rich oil from the 1800-pound absorbers combines with that from the sales-gas absorbers and is flashed successively at 600, 200 and 35 pounds per square inch. The flashed gases are contacted at respective pressures in the reabsorber for the desired butane retention. The residue gas from the high-pressure reabsorber is delivered to the sales-gas system. The residue gas from the intermediate-pressure reabsorber is used for plant fuel, any excess being recompressed, cooled and delivered to the sales-gas system. The residue gas from the low-pressure reabsorber supplies fuel for the boilers and direct-fired heaters. It is not necessary under the above system of rich oil flashes and reabsorptions to design for a high percent butane extraction in any of the reabsorbers. The favorable result is in that rich-oil feed to the still system contains a minimum of dissolved methane and ethane hydrocarbons.

Condensate System

A separate system is provided for processing the liquid formed by retrograde condensation and separated from the gas in the 1800-pound and 800-pound sales-gas separators. It may be of interest to point out several of the factors which influence the selection of this design.

1. To eliminate possible future difficulties with salt water of other contamination of the absorption-oil system.
2. To relieve the steam-stripping loads on absorption-oil stills.
3. To permit partial operation of the plant when units of the absorption plant are shut down.
4. To give added flexibility for varying the end-point of the gasoline product.

The liquid separated in the 1800-pound inlet-gas separators is flashed into the sales-gas separator, operating at 800 pounds per square inch. This permits reabsorption of the flashed gases at optimum pressure and reduces the quantity of field wet gas required to supply the sales-gas demands. The 800-pound separator liquid is further flashed in stages to 600, 200 and 35 pounds per square inch, the flashed gases going to the previously mentioned reabsorbers operating at these respective pressures. In this manner, all of the flashed vapors are properly processed in the reabsorption system for the retention of the desirable butanes. The liquid from the low-pressure condensate flash tank is delivered by pump through heat exchangers, a pre-heater, and into the condensate still operating at 45 pounds per square inch. Sufficient stripping steam is introduced into the base of the still to effect the removal of all the 250° F. end-point and lighter hydrocarbon fractions, the overhead vapors passing through a condenser where approximately 90 percent condensation is obtained. External reflux is returned by the reflux pump to the top of the still for the desired end-point control of the overhead product, while the net overhead product is introduced as liquid into the vapor stream from No. 1 still, just upstream of the final-product condensers. The product from the base of


LEGEND
TO FLARE
TO SALES GAS
TO BOILERS
TO HEATERS
RELIEF TO FLARE
TO SLOP OIL CLASSIFIER
TO FLARE
SALES GAS COMPRESSOR
SALES GAS STOR TANK
INT. & GAS STOR TANK
CONDENSATE VAPOR STOR TANK
FUEL GAS STOR TANK
MULTI-STAGE PUMP
INT. PR. READS. L.O. PUMP
INTER COOLER
FLASH OIL COOLER
FIRED HEATER
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H.P. ABSORBERS
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L.P. READSORBER
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OIL EXCH.
FAT OIL FLASH TK.
NO 1 STILL
NO 2 STILL
NO 1 STILL COND.
NO 2 STILL COND.
VENT
NO 1 STILL COND. SEP.
NO 2 STILL COND. SEP.
K.O. DRUM
NO 1 STILL REFL. PUMP
NO 2 STILL REFL. PUMP
NO 1 STILL REFLUX ACCUM.
NO 2 STILL REFLUX ACCUM.
GASOLINE DEPRETREATER TK.
K.O. COOLER
PROCESS MAINTENANCE COMPRESSOR UNITS
OUTLET SCRUBBER
INPUT WELLS
H.P. COND. VENT TK.
INT. & COND. VENT TK.
L.P. COND. VENT TK.
COND. PUMP
COND. EXCH.
COND. TRIM HEATER
COND. STILL
REFLUX COND.
REFLUX COND. STILL REFL. PUMP
COND. STILL REFL. ACCUM.
REFLUX COND.
REFLUX ACCUM.
REFLUX PUMP
DEBUTANIZER COLUMN
HEAT EXCH.
DEBUTANIZER SURGE TANK
REFLUX COND.
LIQUID REFRIG. REFLUX PUMP
REFLUX ACCUM.
REFLUX PUMP
DEPROPANIZER CONDENSER
HEAT EXCH.
CONDENSING COND.
DEPROPANIZER FEED PUMP
DEPROPANIZER REFLUX ACCUM.
D.P. PUMP TO SYSTEM
D.P. BOTTOMS TO DEBUTANIZER
OIL HEATING STILL
D.P. CIRC. PUMP
D.P. HEATER
FUTURE PRO'PANE PLANT
GASOLINE TO STORAGE
BUTANE AFTER COOLER
BUTANE TO STORAGE
AFTER COOLER
PENTANES + TO STORAGE
PENTANES + TO STORAGE
ALL PRESSURES GIVEN IN POUNDS PER SQUARE INCH GAUGE
FLOW DIAGRAM
THE HUMBLE OIL & REF. CO. KATY, TEXAS

FIGURE 1

the condensate still is heat exchanged against the feed material and then delivered to storage as gasoline-free distillate.

Distillation System

The primary purposes of the distillation system are to process the rich oil from the absorption unit, remove the desired gasoline fractions, and provide a well stripped heavy absorption oil for recirculation to the absorption system. To accomplish these, it is necessary to operate a two-still system. The No. 1 still, operating at 90 pounds per square inch, is designed to remove the 250° F. end-point gasoline product from the rich oil. This is accomplished by pumping the rich oil from the absorption system through heat exchangers and direct-fired heaters to bring the temperature level to 530° F. Sufficient stripping steam effects the removal of the desired overhead fractions while a hot reflux controls the gasoline final boiling point. The liquid condensed from the overhead of this still provides the raw charge to the stabilizers.

Oil leaving the base of the No. 1 still contains hydrocarbons boiling between 250 and 500° F. The No. 2 still, operating at 5 pounds per square inch, receives this oil feed for further processing at approximately 500° F. Sufficient stripping steam removes the heavy hydrocarbons and gives control on the initial boiling point of the absorption oil from the bottom of the still. The stripped absorption oil is next pumped through the heat exchangers and final oil coolers and to the various absorbers. The overhead product is condensed and delivered to storage with the bottoms from the condensate still.

The absorption oil for the sales-gas absorbers and the high-pressure reabsorbers is withdrawn as a side stream from the main high-pressure lean-oil pump. The pump for delivering the oil to these absorbers is a 1900-horsepower steam-turbine-driven centrifugal unit. It is designed to handle a normal load of 1340 gpm, 250 gpm being withdrawn at 800 pounds, while 1090 gpm is pumped to the four high pressure absorbers operating at 1800 pounds per square inch. The total absorption-oil circulation for the plant amounts to 1673 gallons per minute of 36 degrees API-500° F.-initial-boiling-point-oil.

Stabilization Unit

The stabilization unit is designed to produce two finished products. They are (a) a mixture of butanes, with or without propane, and (b) a butane-free specification end-point gasoline. These products, in addition to the heavier fractions from the distillation system, constitute the plant's total production.

The stabilizer scheme followed in the plant design is similar to the arrangement of most stabilizer installations. However, the depropanizer unit has one particular feature which is seldom found in other plants of this nature. The raw gasoline feed material, containing a small quantity of methane and ethane hydrocarbons, is pumped into the depropanizer operating at 285 pounds per square inch. Practically total condensation is obtained on the overhead material of propane and lighter hydrocarbons upon cooling this stream for reflux.

A turbine-driven triplex repressuring pump with 285 pounds suction pressure and 3400 pounds discharge pressure will handle all excess reflux, thus permitting the return of this material as a liquid into the discharge header of the main gas compressors and hence to the injection wells. This method of operation affords a saving in investment as well as the elimination of a recompressor, thereby reducing the operating expenses.

The liquid from the depropanizer reboiler, consisting of the butanes and heavy hydrocarbons, is next fractionated in the debutanizer column. Here the butanes are removed as an overhead specification product, while the final gasoline is withdrawn as a bottom product. The butanes are condensed and transferred to two 5000-barrel spherical tanks for storage while the gasoline

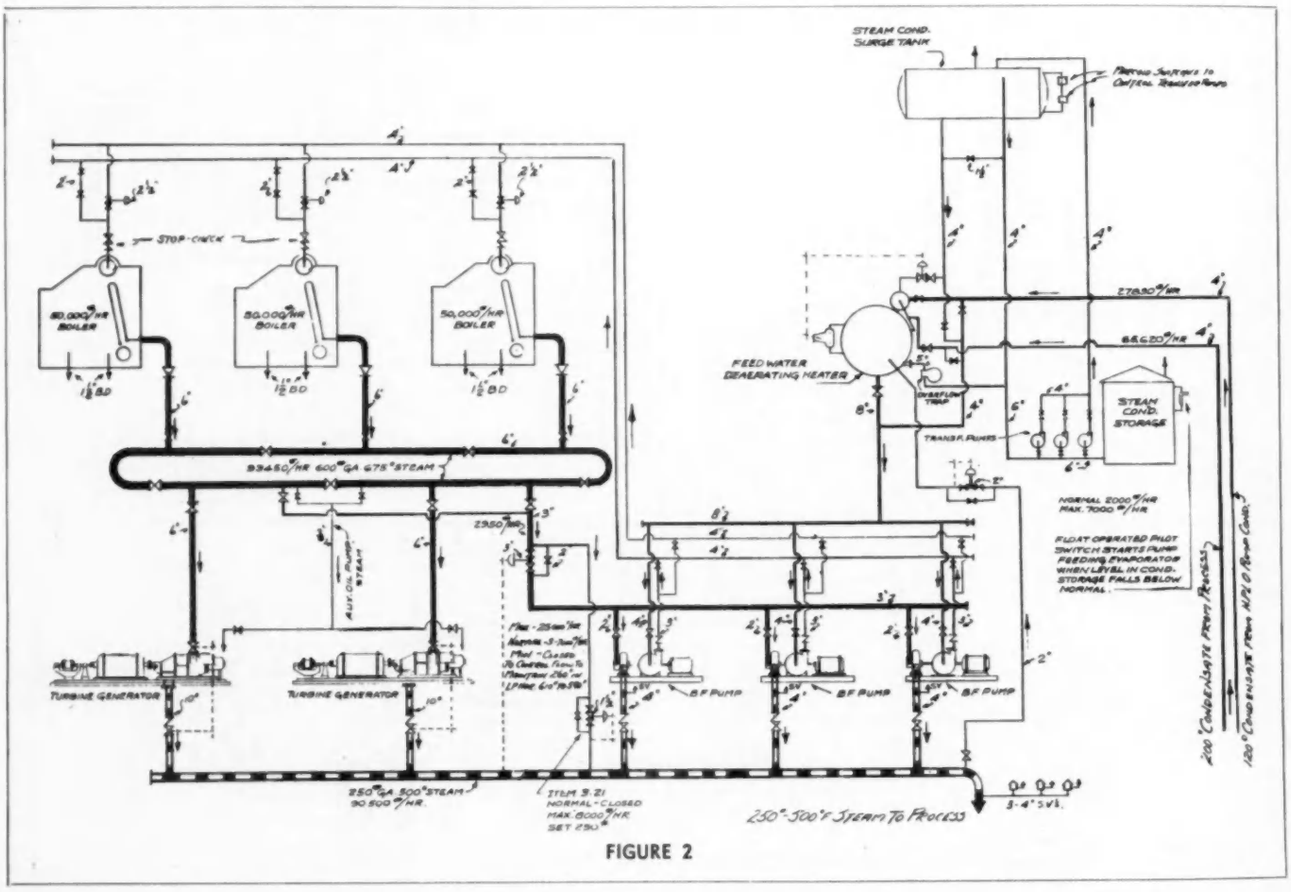


FIGURE 2

HAYSTELLITE INSERTS
reduce drilling costs

Good bits, correctly set with Haystellite inserts and faced with Haystellite tube rod, assure maximum round-trip footage of out-to-gauge hole.

There Is a Size and Style of Haystellite Insert for Every Type of Drilling Bit

HAYNES STELLITE COMPANY

Unit of Union Carbide and Carbon Corporation

New York, N. Y. UCC Kokomo, Ind.

Chicago, Cleveland, Detroit, Houston, Los Angeles, San Francisco, Tulsa

Haystellite cast tungsten carbide inserts are available in thirteen standard sizes and shapes. One type is shown here, actual size.

The word "Haystellite" is a registered trade-mark of Haynes Stellite Company.

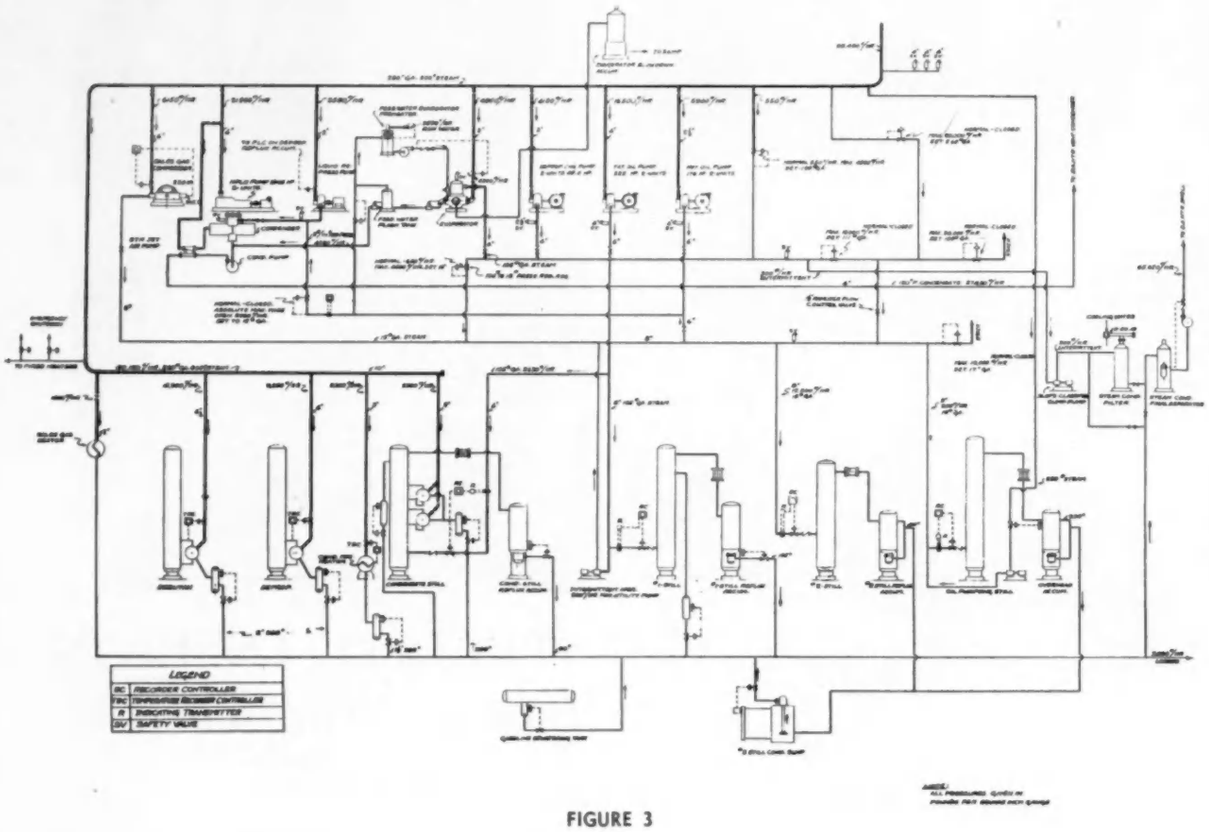


FIGURE 3

fraction is cooled and delivered to three 5000-barrel spherical storage tanks.

Humble Pipe Line Company has a pump station located on the plant site to handle deliveries of the plant products to the Baytown plant of Humble Oil & Refining Company. The butane product is pumped to the Satsuma-East Texas gasoline line through 17 miles of 4-inch pipe. The gasoline and heavier products are pumped through 9 miles of 4-inch pipe line to the Raccoon Bend Pumping Station.

Steam and Power System

The steam and electric system for the Katy Gas-Cycling Plant is quite unusual as compared with that encountered in most plants of this nature. During the preliminary discussions of the plant design, it was decided to use steam and electrically-driven centrifugal pumps where practical. The plant process required approximately 95,000 pounds of steam per hour at 250, 105 and 15 pounds per square inch pressure, and an electric power and lighting load of 1740 kw.

Comparisons were made of the various combinations of steam and electric drives for the different services and combinations of condensing and non-condensing steam plants operating at 250 and 600 pounds per square inch steam pressure. These comparisons included installation and operating costs and trial heat balances.

After analyzing the various power schemes, the most attractive was the generation of steam at a pressure of 600 pounds per square inch, generating the required electrical load by back pressure-steam turbine-driven generators, and staging the steam pressures down through the plant so that the total steam required for the generator drives balanced the requirements for process heating, stripping, and pump drives.

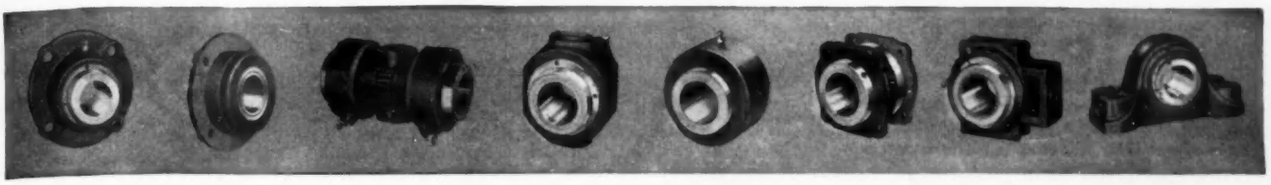
A brief discussion of the steam system will illustrate the principal features of interest. Figure 2 shows the arrangement in the power plant, while Figure 3 details the methods of utilizing the steam in the distillation system.

To meet the processing requirements of steam, three 700-pound working pressure boilers are installed. Each boiler is designed to produce 50,000 pounds per hour steam at 600 pounds pressure and 675° F. temperature. The boilers are of the integral furnace type, completely water walled, and equipped with forced and induced draft fans with stub stacks.

For the calculated electrical load of 1740 kw., there are installed two 2000-kw., 440-volt, 3-phase, 60-cycle, 3600 rpm turbo-generators. The turbines operate at 600 pounds inlet steam pressure and throttle to 250 pounds back pressure. Normally, two boilers and one turbo-generator will be operated.

Steam from the 600-pound header is used to drive the generator and boiler-feed pump turbines, the exhaust pressure from these turbines being maintained at 250 pounds per square inch. The exhaust steam at 250 pounds per square inch is next utilized in the distillation unit process for heating, stripping and driving certain pumps. The steam as utilized in these services is all condensed and returned to the deaerating heater for feed to the boilers. An elevated surge tank maintains constant make-up water to the heater and any excess water overflows to the storage tank. The pumps at the storage tank are operated automatically to maintain proper water level in the surge tank, while a float-operated switch controls the operation of the make-up evaporator to maintain constant water level in the tank.

There are three dual-drive centrifugal feed-water pumps, operating at 3550 rpm each, driven through a flexible coupling by a 150-horsepower motor at



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FRICTION FIGHTER

BEARINGS

Roller and Ball Types

one end and by a steam turbine at the other end.

An automatic regulating valve in the steam line to the three turbines divides the power input to the pumps between the turbines and motors for the purpose of controlling the steam pressure in the 250-pound exhaust header.

Complete automatic combustion control equipment is installed on each boiler for maintaining pressure, forced draft, furnace draft and induced draft.

The distribution and utilization of the steam from the boiler house at a pressure of 250 pounds per square inch is one of the most interesting systems in the plant. Approximately 56,450 pounds per hour of steam is required for driving the various pumps in the distillation system while 36,450 pounds per hour are utilized in heating in the stabilizer reboilers, the condensate-still preheater and reheaters. A steam demand of approximately 25,000 pounds per hour at a pressure of 105 pounds per square inch is required for stripping in the No. 1 still and condensate still. The turbines driving the fat-oil pumps and the depropanizer charge pump are of the back-pressure type, exhausting into 105-pound steam header. The steam from the make-up evaporator goes into this header. The 105-pound steam is next used in stripping as illustrated. The quantity of stripping steam required at 15 pounds per square inch is 12,700 pounds per hour. To provide this steam, the turbines driving the hot lean-oil pump and recompressor exhaust into a steam header operating at 15 pounds per square inch. The pressure in the 15-pound steam header is controlled by means of a pressure-reducing regulator from the 105-pound system. Sufficient regulating and relief-valve equipment is installed to prevent excessive pressure in any of the steam headers during either partial or full-load operation.

The centrifugal oil pump, delivering absorption oil to the high-pressure absorbers, is driven by a 2000-horsepower steam turbine operating at 3600 rpm. The inlet steam is at a pressure of 250 pounds per square inch, while the turbine exhaust steam is piped into a 2800-square-foot surface condenser operating under four inches mercury back-pressure. The exhaust steam from the turbine driving the liquid repressuring pump along with any excess steam from the 15-pound steam header is also introduced into this surface condenser. The condensate from the hot well of the condenser is returned by pump to the deaerating heater in the power plant.

The condensed steam from the various units of distillation equipment is returned to a steam condensate filter and separator system where any trace of oil or contamination will be removed and the condensate returned by centrifugal pump to the deaerating heater located in the boiler plant.

This method of operation assures practically total return of condensed steam for feed to the boilers. The expected make-up requirement is less than 5000 pounds per hour.

Electrical

The main switch board located in the power plant is of the dead-front, metal enclosed type with draw-out circuit breakers and interconnecting bus structures for the control of the underground system rated at 440-volt, 3-phase, 3-wire, 60-cycle current. Main generator and feeder-panel breakers are electrically operated with the distribution-panel breakers being manually operated with inverse time delay trip and several are equipped with shunt electric trip.

Two sets of underground cables are run in separate fiber ducts buried in concrete to separate bus ducts in the switch houses located near the cooling tower, distillation unit pump building and the compressor building, each set being protected by a circuit breaker in the power house. In order to insure continuous operation of these essential units, half of the motor load at each center will be on the breaker located on distribution board "A" and half of it on board "B." Motor load in the power plant is divided in the same manner. The system is balanced so that the entire load is almost exactly equal on the two feeder breakers.

Each motor at load centers has an explosion-proof push button near it. Standard line starters and circuit breakers are located in the switch houses.

Plant Safety Features

The necessity for providing safety devices in an average gasoline plant is obvious. In a large high-pressure cycling type plant, it is of utmost importance to give particular attention to safety features. The safety arrangements although sometimes very simple, act as guards to warn of trouble, and also to protect the equipment against damage. There are many safety features of interest in the Katy plant, a few of which will be briefly discussed.

1. *Emergency high pressure gas control system:* In order to protect the plant in case of some failure in the high-pressure-gas system, piston-operated plug valves are installed on both the producing and injection lines at the plant boundary. These valves are operated from a series of manually-operated control stations strategically located in the plant operating area. Such operation will shut off the incoming and outgoing gas, as well as shutting down the compressor unit. At the same time, another piston-operated valve will open to permit the blowing down of the high-pressure gas within the plant to a flare stack located on the south boundary of the plant yard.

2 *Protection of direct-fired heaters:* The direct-fired heaters have both a hand-operated steam snuffing system and an emergency snuffing system, which may be operated in case of tube failure or fire. As a protection against the loss of oil flow through the heaters, which may happen in the event the rich-oil pump fails, the fuel gas will automatically be shut off, thus reducing the hazard of coking up the heater. A third feature is that a failure of fuel-gas supply will automatically close the fuel regulator which must be manually reset, thus eliminating a fire hazard.

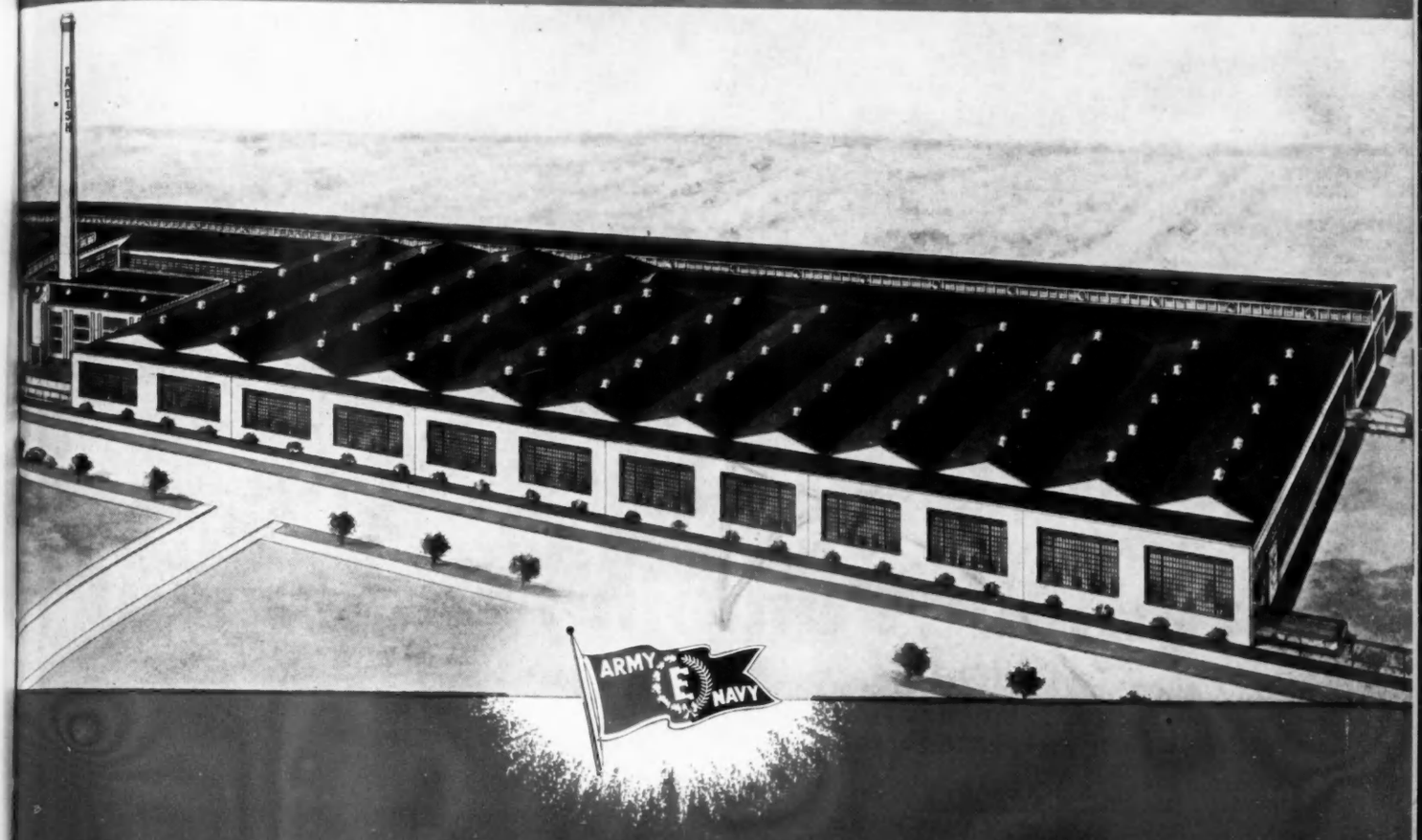
3. *General alarm system:* In order to warn the plant operator of trouble in the system, an arrangement of alarm whistles is installed on the various vessels requiring special attention against certain adverse operating conditions. However, if the problem is beyond the operator's control, another set of safety controls will automatically shut down the major mechanical equipment, thus insuring protection against damage.

Cooling Water System

In a cycling plant of usual design, having the capacity of the Katy plant, the quantity of cooling-water circulation would be approximately 20,000 gpm. By a careful balance of heat requirements and equipment installation, the Katy plant requires only 14,000 gpm. This reduction is a result of balancing the cooling loads for the closed shell-and-tube type condensing and cooling equipment against the cooling required for the atmospheric cooling sections located in the base of the cooling tower. Approximately 14,000 gpm. is required over the coils in the cooling tower. The water in passing over these coils increases in temperature from 85 to 95° F. This 95° F. water is then pumped in parallel flow through the shell and tube equipment of (1) Engine Jacket Water Coolers, (2) Exhaust Steam Condenser, (3) No. 1 Still Primary Reflux Condensers, and (4) No. 2 Still Primary Reflux Condensers. The water, after passing through these units, is delivered over the top of the cooling tower for distribution and reduction in temperature from 115 to 85° F., thus completing the cycle of water flow.

Raw water for the plant make-up is supplied from water wells in the plant yard. A 500-gpm. pump delivers water from the water wells to a 3000-barrel settling tank. This make-up water, in its route to the cooling tower, is utilized for cooling in the low-pressure reabsorber intercooler and various other minor cooling duties required in the power and distillation unit equipment. The raw water supply is also connected to the plant camp and to all fire systems.

July 15th



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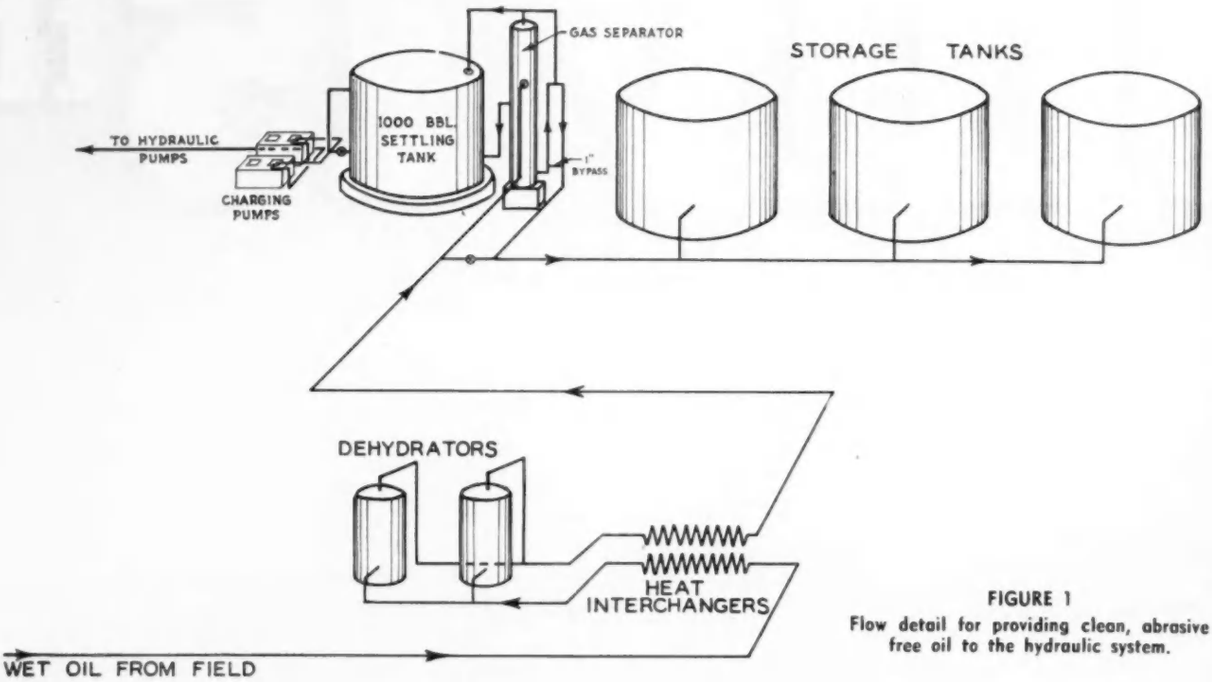

FIGURE 1
Flow detail for providing clean, abrasive free oil to the hydraulic system.

Proper Installation of Hydraulic Pumping Equipment

By K. C. VAUGHN, Production Foreman, Union Oil Company of California

FIELD experience in the installation of hydraulic pumps has resulted in continual improvement. A recent installation, which will be described in this article, attempted to take advantage of as many of these improvements as possible under existing well characteristics and local conditions. The setting includes several operating features. Results have been encouraging, but possible changes already have been planned and it is expected that future projects will include many more. Fundamental requirements, however, are well established.

Hydraulic pumping experience has dictated several simple but essential prerequisites for satisfactory operation. These are: (1) dehydration facilities to meet the required demands, (2) reserve oil to provide uninterrupted operation for short periods, (3) wax control, (4) a central power that will guarantee ample power oil and constant supply, (5) arrangement of facilities in order to simplify operations, and (6) a program for training personnel in the operation

Central hydraulic power installation.

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of hydraulic pumps. These will be discussed in order.

Dehydration

Clean, abrasive-free power oil is essential to efficient operation. The method of dehydration is unimportant so long as the desired results are obtained. Wash tanks in combination with chemical treatment have been successful, particularly with higher-gravity oils. The addition of heat to the process is usually necessary but is dependent on the composite temperature of the production. Electrical dehydration has also been adequate and results are more consistent than those from wash tanks. In either system it must be remembered that throughput will be increased by the amount of power oil circulated and sufficient capacity must be available for maximum conditions. Cut requirements of the power oil will depend upon the depth of the wells to be pumped or, more directly, upon the operating pressure. Irrespective of depth, however, power oil should be kept as clean as practical.

Abrasive material must be eliminated. One operator experienced excessive trouble because the cut of 0.4 percent consisted almost entirely of abrasive material. Hydraulic pump valves, line valves and subsurface pumps would cut out in a short time. Power oil was supplied from the top of a small wash tank and agitation prevented the settling of the abrasive material. Correction was made by using an available 2000-barrel storage tank as a settling vessel.

It is recommended that all installations be provided with a settling tank sufficiently large to provide at least 12 hours throughput time, 24 hours being a safer general rule. The installation under study here (Figure 1) received dehydrated oil from a point midway up the boot used to separate gas from the oil stream. This gas is separated in order to prevent rolling and improve settling. The settling tank is located on a higher level than the rest of the storage battery and is kept automatically full by the presence of a "gravity leg." The bottom of the "gravity leg" is provided with a small bypass to prevent water locking or filling of the upstream riser of the leg with water. The above described method was chosen instead of an automatic motor valve because there are no moving parts and the elimination of gas is advantageous. Also passage of the entire stream of dehydrated oil through an average size settling tank, before final storage, materially reduces its effectiveness. To obtain comparable results by this method would require a larger tank.

The settling tank ordinarily discharges from the top outlet but a reserve is always available by using the bottom outlet. This reserve is sufficient to provide oil for several hours operation in case of dehydrator shutdown or other trouble.

Wax Control

Wax trouble has been encountered by all operators in the various phases of production operations. However, no universal remedy has been forthcoming and the installation herein described is no exception. Samples of oil were taken prior to installation and laboratory

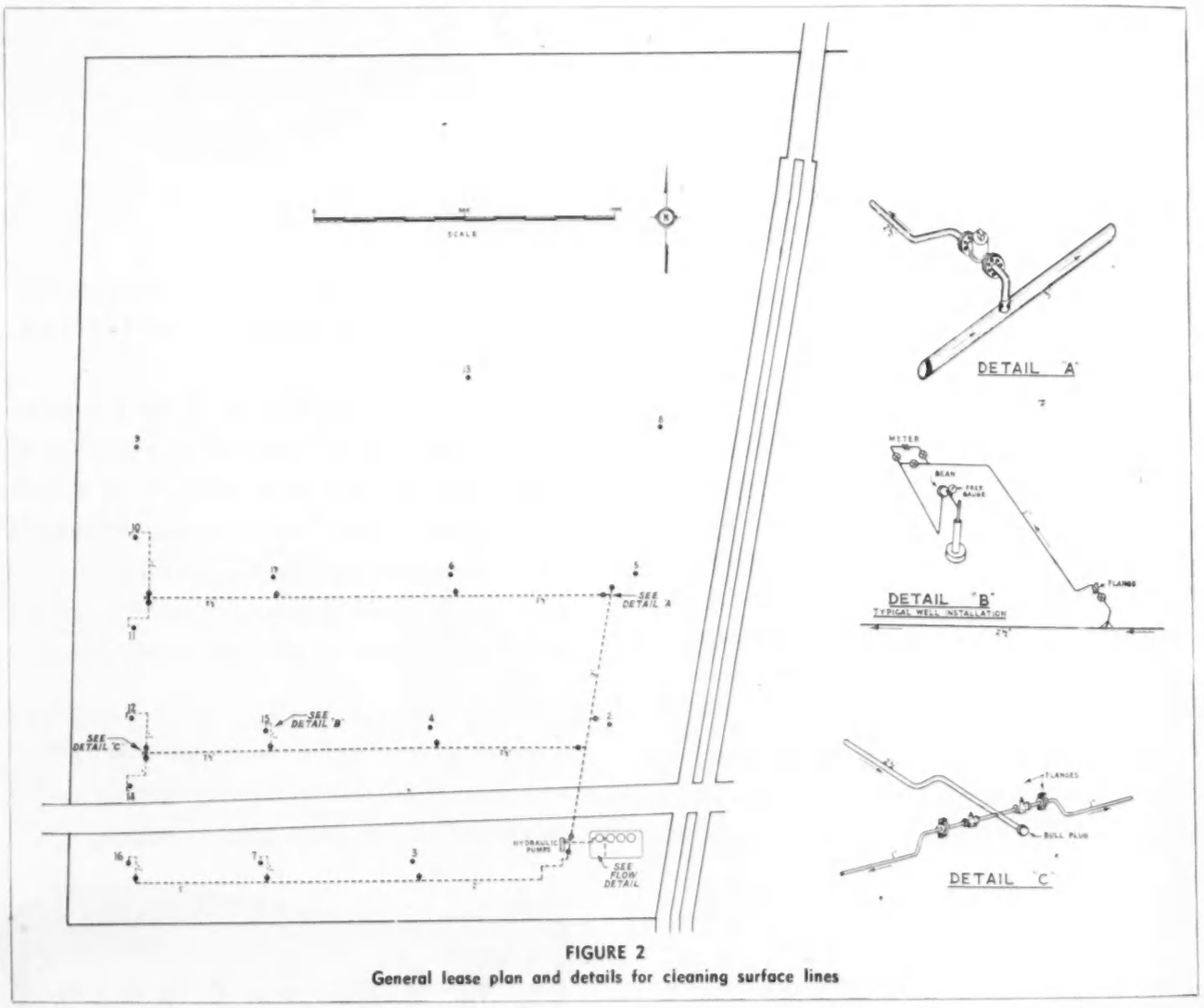

FIGURE 2
General lease plan and details for cleaning surface lines

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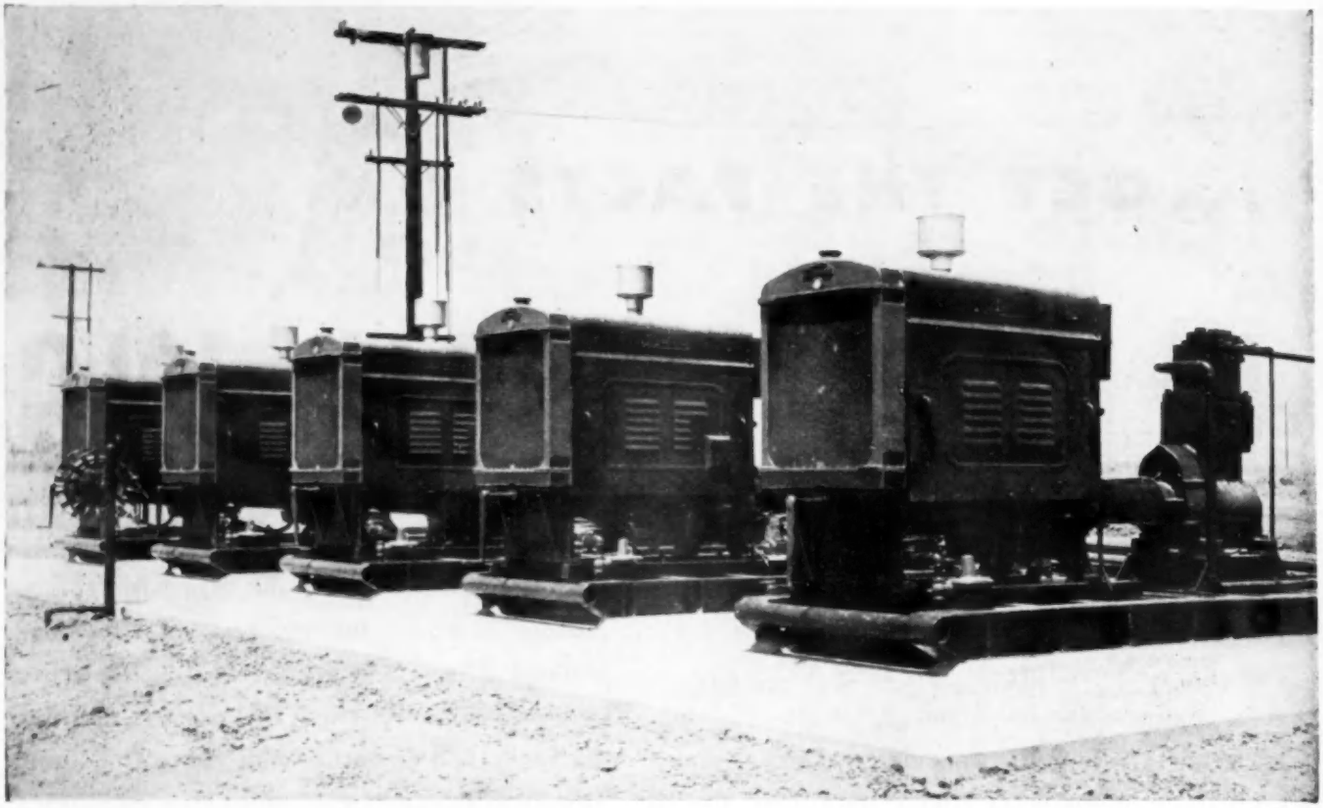


Radiators face prevailing winds. Hose reel with center connection aids in keeping setting clean.

tests made to determine deposition characteristics. Tests were conducted on the oil at 90° F. and 150° F., using cooling temperatures ranging from 60°F. to 80° F., for the 90° F. temperature, and 65° to 90° F. for the 150° F. oil. Deposition was noted in both cases, but was negligible when the cooling temperatures were maintained above 80° F. It, therefore, seemed evident that by heating the oil to at least 150° F. and insulating the power-oil lines to the wells to prevent a marked temperature gradient, surface lines would be free of wax. Past field experience indicated, however, that such a procedure would result in transferring the wax trouble to the well tubing.

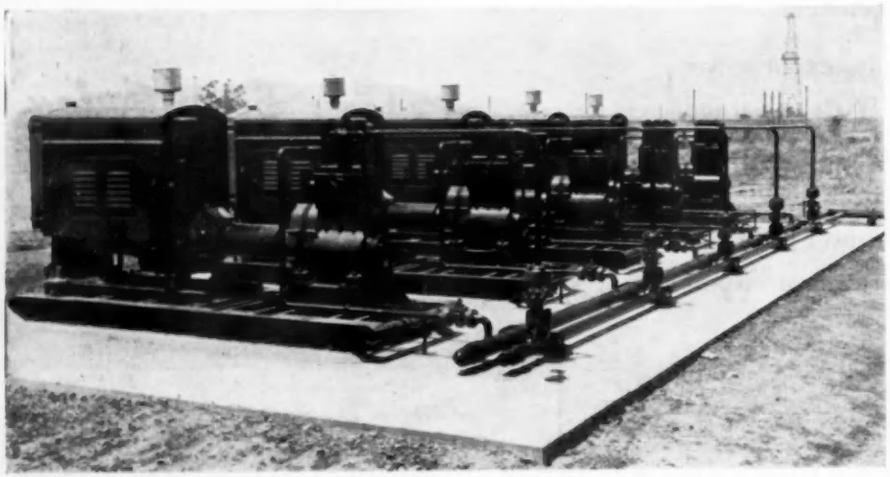
A decision was made to defer installation of a heater and insulation of power-oil lines. It was anticipated that temperatures at the well head would approximate atmospheric, and it was hoped that this condition would result in a temperature rise in the power oil on the round trip. Little difficulty is experienced in keeping wax in the oil under these conditions.

After approximately six months of operation it has been noted that considerable deposition of wax has taken place in the settling tank, but power lines show only a slight coating. The 1¼-inch power tubing has been clean, but some deposition was noted in the 2½-inch tubing.

Surface lines are prepared for cleaning by placing pull plugs, tees and valves at points where oil-soluble plugs can be inserted and pumped through to remove the wax (Figure 2). Large main distributing lines insure that cleaning will be infrequent, and short individual lines can be cleaned quickly and effectively without interruption to other wells.

The 1¼-inch power tubing is equipped with a knockout collar located close to the pump. Before pulling, a knockout bar is dropped and a wire brush with two leading rubber balls pumped down the string, followed by solvent. This serves to remove any wax deposit and abrasive material from the walls of the tubing.

Wax deposition with the oil in use is probably small as compared to some Mid-Continent crudes, but any plans for hydraulic pumping, regardless of location should consider the possible problem of wax, and if necessary methods for control.



Suction and discharge lines are anchored on surface. Relief lines, drain lines, gas fuel lines and conduit for emergency shut down are below the surface.

Central Power

A central hydraulic power system supplying oil to pump several wells is similar to a compressor plant furnishing high-pressure gas for circulation. The operator has "a lot of eggs in one basket" and it is essential that provi-

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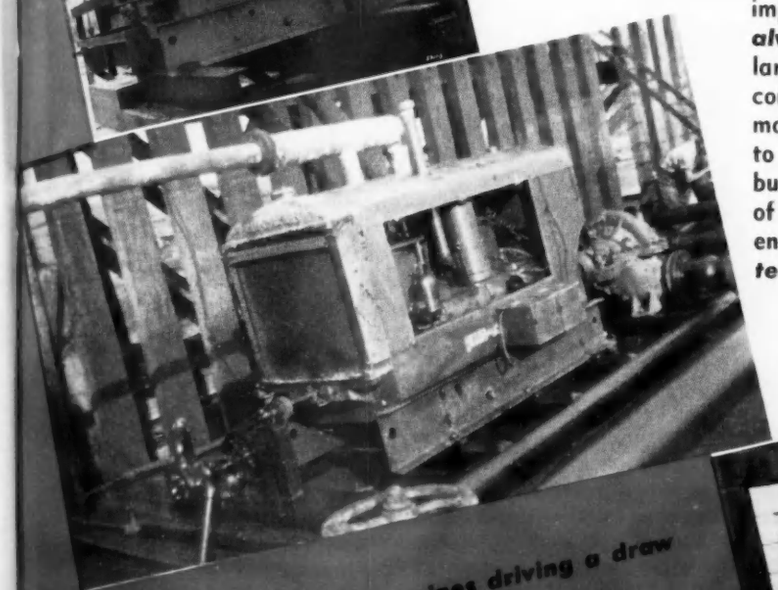
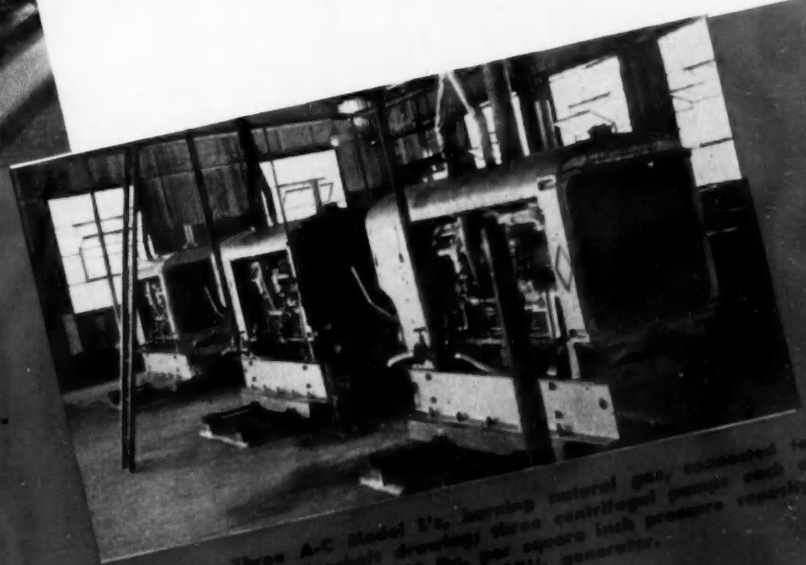


Top: Two A-C Model L engines driving a draw works and mud pump.

Center: A-C Model L power unit on a deep pumping well. 590 ft. lbs. torque.

Above: A-C Model L power unit, barge mounted, used to unload oil from barges.



Three A-C Model L's, burning natural gas, connected to same flowsheet drawing; three centrifugal pumps each of 1200 G.P.M. at 40 lbs. per square inch pressure capacity, and one 15 KW and one 17½ generator.

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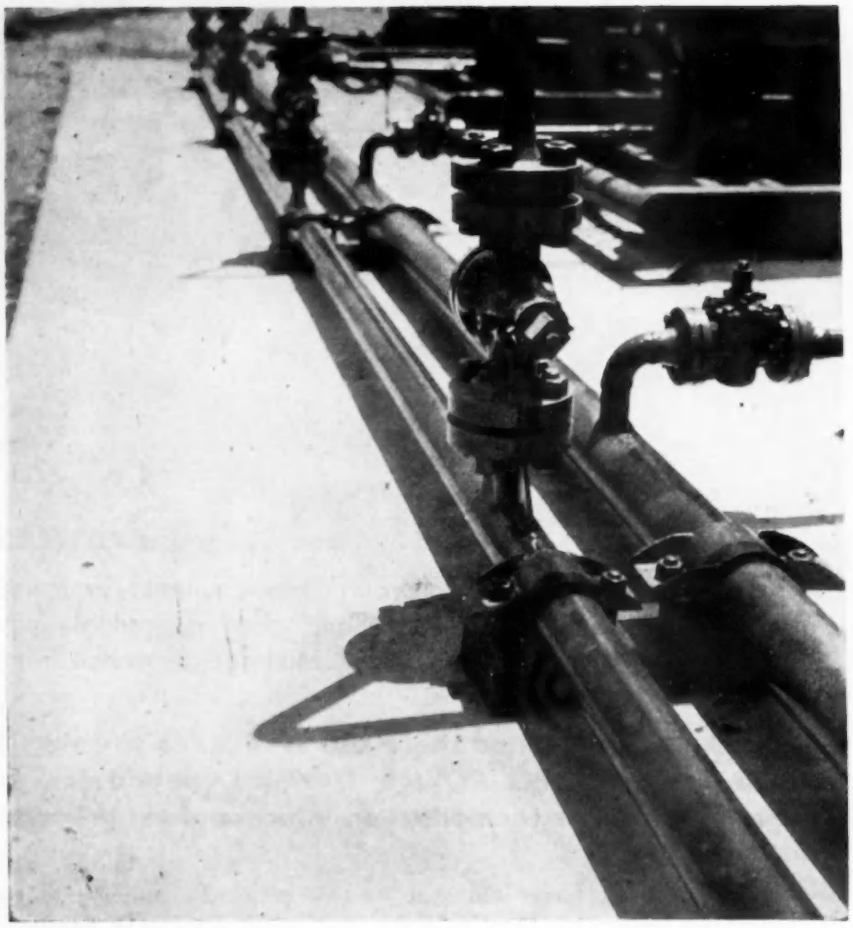

Suction and discharge lines are well anchored to reduce vibration. Flanged connections are used throughout.

sions be made for an ample, uninterrupted supply of oil at constant pressure. If this condition is not met considerable difficulty will be encountered in attempting to control production rates. If maximum production is required there will be a decided loss.

Estimated power oil required should be conservative to take care of potential tests, maximum production and periods of low pump efficiency. The requirements for hydraulic pumping will vary slightly with depth, but in most cases the ratio of power oil to production should not be less than 2 to 1. Also, a standby pump should be included if the size of the project warrants the additional expenditure. Installation of this standby facilitates engine and pump service and repair, and increases flexibility. If the charging pumps are not a part of a unitized assembly, a standby charging pump should be present.

The installation shown consists of five engines and hydraulic pumps, less charging pumps. A separate motor-driven charging pump provides oil for the entire setting. This choice was made to reduce maintenance by eliminating five individual pumps, ten belt drives, countershafts, housing, etc. It was felt that power failures were so infrequent that separate power source would not be troublesome.

A few features included in this power setting are:

(1) Flanged and welded fittings and plug valves throughout to reduce leakage from vibration.

(2) Elimination of the spacer-block scavenger pump. All drainage from the spacer block is by gravity to main drainage system.

(3) Elimination of all individual pressure gauges and installation of a recording pressure gauge. This gauge is invaluable in studying operation. It can be seen from the clutch of each engine.

(4) Installation of a mercoid-operated relay switch to shut down engines in case of oil-supply failure.

(5) Installation of starters on each engine. Engines are started from batteries in the pumper's car by means of a cable and plug.

(6) Presence of an oil-bath gas-fuel scrubber.

To encourage "good housekeeping" and facilitate repair, a cement floor surrounds the setting. Deep drainage pits under each pump and a sloping apron help keep the setting clean and orderly. Drain lines, gas-fuel lines, electrical conduits and relief oil lines are under the floor. Only the suction and discharge lines are located on the surface.

Well Facilities

The well manifold provides convenient access to the pumper and can be easily dismantled and assembled by production crews. Use of knockout collars assures practically the same spacing each time a pump is rerun and the location of unions at convenient points speeds up maintenance work. Power-oil meters and production meters are located together near the road circling each location. A positive type rotary flow bean is used to control input oil rate and their use is helpful in maintaining pump speeds at chosen points. Combined with a constant discharge pressure, these beans provide a common basis for comparison. In fact pump speeds are often difficult to obtain and the results are inconsistent. Any control method based on speed alone requires considerably more supervision and attention.

The seven wells now produced by hydraulic pumps are approximately 7000 feet deep and are all serviced by a portable production mast. Locations are standardized for guy wires and back-up plates and little time is lost in preparation for servicing. All of the 1¼-inch tubing is suspended in 60-foot stands from hangers in the derrick. Hanging this tubing eliminates the necessity of a middle support and the use of tubing protectors.

Personnel Training

Hydraulic pumps will not stand the abuse sometimes given a conventional rod pump and, therefore, it is important that pumpers be trained to operate wells correctly and diagnose trouble intelligently. Time and money spent in this training will be returned with interest. No specific program is suggested, but any method should include a thorough study of the manufacturer's operating manual and inspection of model pumps, torn-down equipment, etc. Establishment of this background makes the explanation of field work much easier. To continue the education during actual operation, it is essential that the pumper be informed of any maintenance and repair to the hydraulic equipment. Interest created and experience gained by following this procedure results in accelerating the entire program.

As an aid to correct diagnosis and efficient operation, it has been found that correlation of operating pressures and operating fluid level obtained by sonic methods is invaluable.

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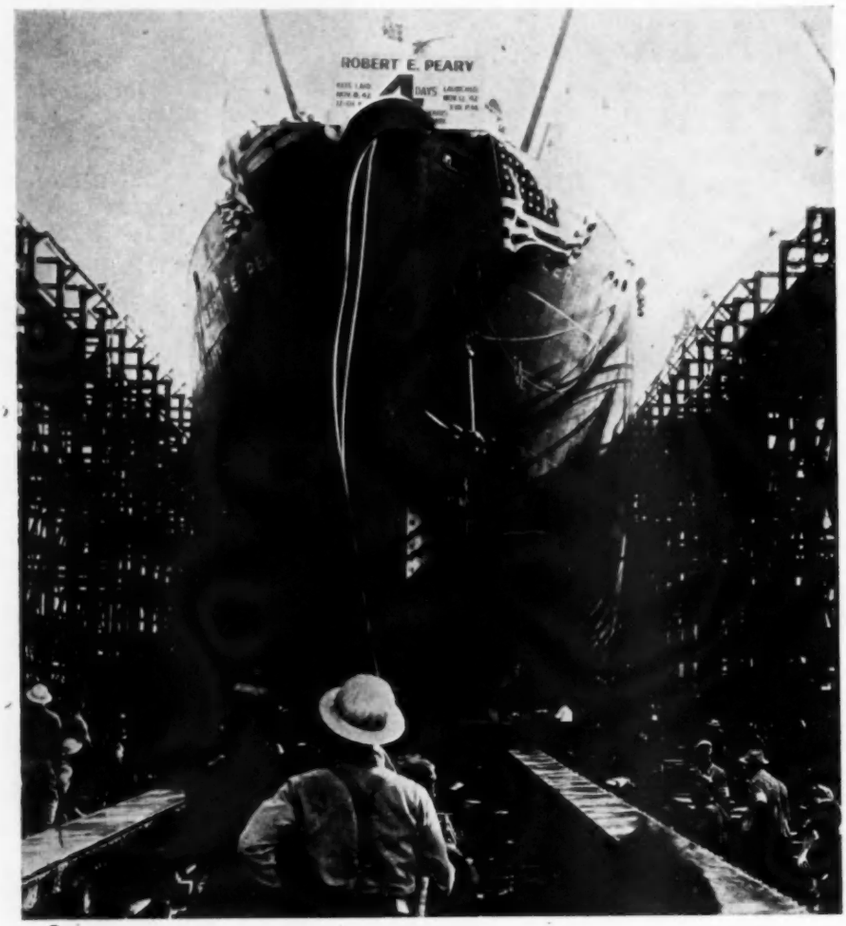
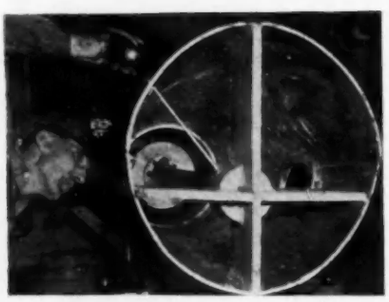


One of the greatest blunders in history was the Axis' failure to evaluate American capacity to produce unheard of quantities of vital war material and the cargo ships required to get that material to fighting fronts . . . *in a hurry.*



Here is a difficult horizontal boring mill job being done with precision on an engine lathe because Oil Center did not have a horizontal boring mill. Raising blocks lifted the spindle so that the job could be mounted on the carriage. I-beams provided a foundation on which to clamp the job. It *can* be done if there's a will to do it!

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Reservoirs

[*Continued from page 13*]

1. Enough wells must be drilled in any event adequately to explore and define the structure and to determine the gas and water levels. The only question involved in drilling, then, is the number of additional wells required and their spacing pattern. Money, labor, time, and materials spent in wells are largely irretrievable. It is not possible to back up from 5, 10 or 20 acre spacing. It is possible, however, to fill in from 40, 60, or 80 acre spacing or any other exploratory pattern employed in outlining production. It seems obvious, then, that the prudent operator will not decide his ultimate well density in advance. He will drill as *few* additional wells as the conditions warrant, with the knowledge that he can fill in later if it should prove to be necessary, rather than drill immediately as many wells as it is estimated can be afforded. Because most fields are developed and operated under competitive conditions, it is necessary that the operators cooperate early in the development to secure a sound allocation formula which will not penalize intelligent development.

2. In the matter of well completion mistakes again will inevitably occur, but several simple considerations will cover most cases:

a. Wells should be completed in such manner as to exclude free gas and water.

b. Any well must take in sufficient producing section to yield oil at a reasonable rate.

c. Where this requirement does not conflict with requirement (b), it is good practice to open to production in a well only one separately identifiable producing horizon, thus providing for better subsequent control. The same result may in some cases be accomplished by multiple zone completions.

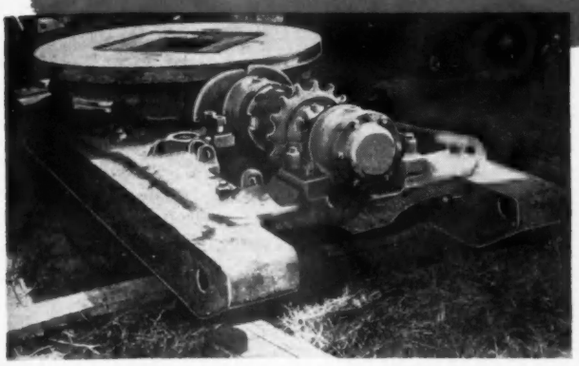
d. Such purely mechanical details as whether to use screen, slotted pipe, gravel pack, or open hole completion depend to a large extent upon local sand conditions and have little or no bearing upon reservoir performance.

The only remaining question is whether to complete wells in the top, bottom, or middle portion of a producing section. The proper position cannot be determined until the type of drive is known. Therefore, the best completion is that which can most effectively and cheaply be changed when conditions warrant. In some areas casing cemented entirely through a producing section and perforated opposite a selected zone affords the best opportunity for successful later change of the producing interval.

[*The second and concluding installment of this paper, which will discuss the control of reservoir performance, will be published next week.*]

Don't Scrap It!

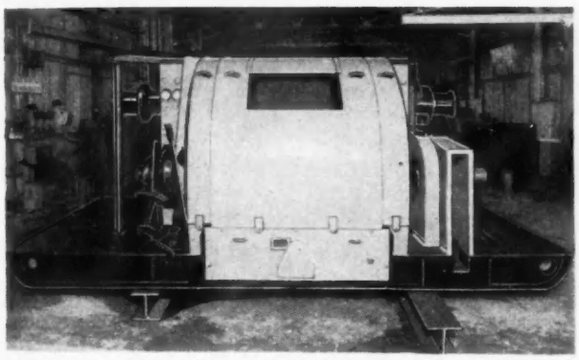
Maybe Your Nearest AMERICAN IRON SHOP Can Put It . . . *Back Into Action!*



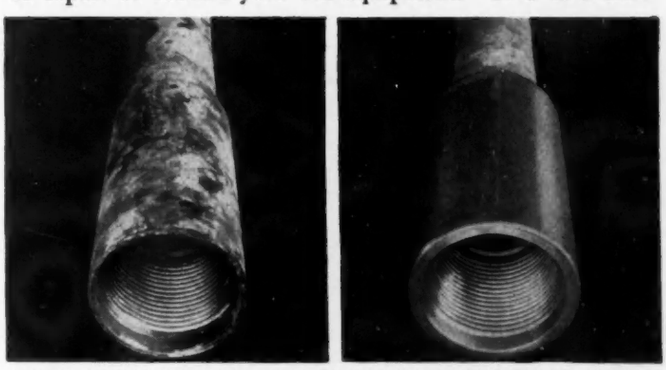
DO YOU HAVE A ROTARY TABLE IN THIS CONDITION?

This rotary table is rusting away in a junk yard, but a trip to one of our shops could put it back into action! We'd completely overhaul it . replace all worn parts . . and send it back in A-1 condition!

UNCLE SAM wants scrap iron but he doesn't want you to junk equipment that could easily be put into action. Never was there a time when it was as important as it is now to make old equipment do the work of new. And that's where your nearest American Iron shop fits in! We have the men . . . the equipment . . . and the experience to repair or rebuild your old equipment. Give us a call!

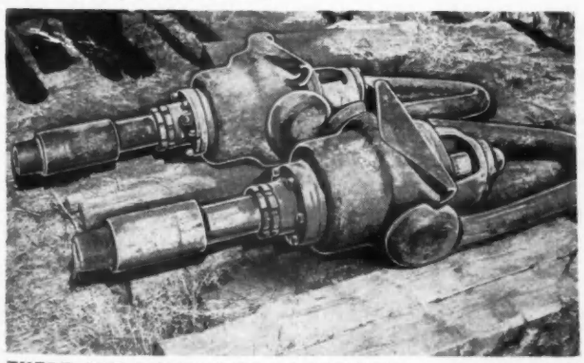


THIS RIG WAS HEADED FOR THE JUNK PILE! But fortunately its owner sent it to an American Iron shop instead. Now it's been completely overhauled and rebuilt and is ready for action. The cost? Far less than what a new rig would cost, yet it's like new.



LOOK WHAT WE DID FOR THIS WORNOUT TOOL JOINT!

This tool joint was worn dangerously thin BEFORE its usefulness was restored by our exclusive HOT ROLLING PROCESS. Thousands of feet of extra footage have been added to its life at a cost of approximately 50% of what new joints cost. Another example of how your nearest American Iron shop can save YOU money . . . save Uncle Sam steel.



THERE ARE MANY FEET OF USE LEFT IN THESE OLD SWIVELS! These old swivels may look as if they had seen their day but they have thousands of feet of use left in them. We've put many swivels that were in worse shape back into action—at a big saving in steel and money!

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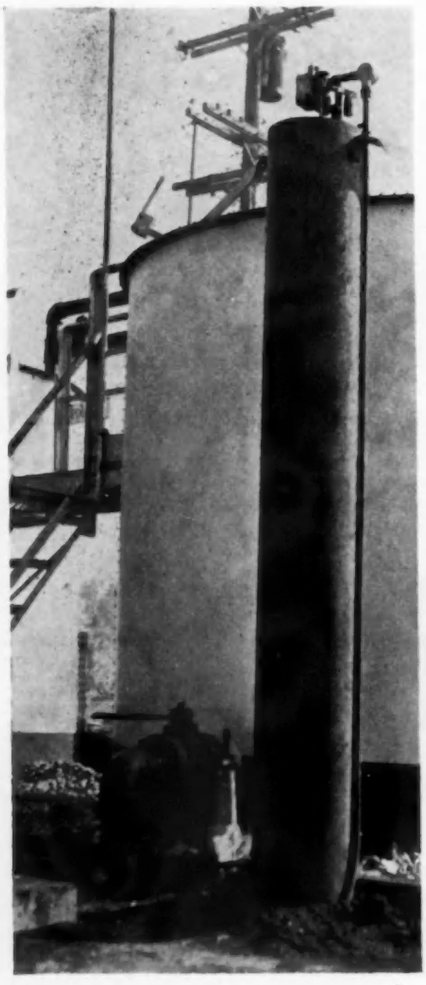
Automatically Controlled Tank Pumps Prevent Trouble, Save Time and Manpower

THE job of watching a flow tank while the shipping pump delivers the oil to the gathering system is a tiresome task for the pumper in normal times, and no matter how closely it is observed the pump at some time will take air into the suction, which later is likely to cause lockage of the pipe line. In wartime, when every man has added duties and time therefore is more vital, automatic control devices are more pertinent for this operation than ever before.

One large producing company recently installed several automatic float type control devices on its leases, and is realizing important savings in man hours. The devices have operated with a minimum of difficulty and are positive in their action, both starting and shutting the pump down. Various types of automatic switches and float controllers have been developed. The one selected by the company referred to is a type entirely separate from the tanks and is not connected to them at any point except by flat iron strap braces. It operates with a short travel of the float, which may be adjusted to any level to shut the pump down before suction connections are exposed.



A float in the standpipe automatically controls operation of shipping point, so level of oil in tank will not be reduced to point suction lines will be exposed and permit air to enter the pumping system. Lower picture is detail of standpipe top.

With this particular type controller, a joint of 10-inch vertical pipe slightly taller than the tank is connected to the plugged end of the suction line by a side-entrance weld. Brace lugs are welded to the walls to which are attached guying straps for support. The upper end of the pipe is open.

The controller is designed to operate when the shipping pump is electric-motor driven, but the switch could be changed to operate as magneto short to stop operation if a gas or gasoline engine is used.

Electric cables lead to the top of the standpipe, where they connect to the starting switch. A float is suspended in the standpipe on a vertical rod extending downward to the point where it desired that the fluid level be lowered no further. The top of the rod is connected to a cross beam with a stirrup connection for freedom of movement. This cross beam is pinned to the starting-switch shaft, and is equipped with balances on the opposite end to make the operation as sensitive as possible. The switch, terminal outlets and float hanger are mounted on the top of the standpipe on a substantial iron bracket.

The operation of the controller begins when the gauger opens the flow-tank valve. Oil flowing from the tank into the suction line enters the standpipe immediately, seeking the level in the tank. This raises the float, which closes the switch at the top of the standpipe, thus starting the pump motor. The float, being installed on the operating rod with a short vertical travel, keeps the switch closed until the pump has lowered the oil level in the tank to the predetermined point. At this time, the pull on the rod is sufficient to break the circut, which immediately stops the motor. Adequate check valves in the system prevent back flow of oil into the empty tank from other sources, and the pumper or gauger can return at his convenience to shut the gate and reseal the tank outlet.

PRACTICAL OPERATING *Hints* FOR THE PRODUCTION MAN

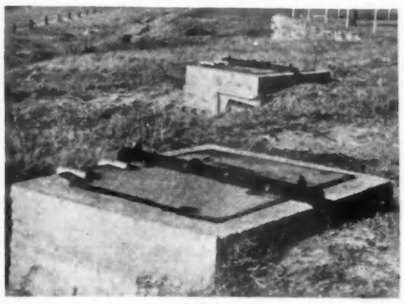
$5.00 will be paid for each illustrated acceptable contribution. Mail to The Editor, THE OIL WEEKLY, *Houston.*

1. ROD LINES

Caissons Protect Road Crossing Units

IF PULL rods are carried at comparatively great depth beneath the ground with the horizontal angle changing abruptly so that hold downs are necessary, the pendulums can be cased in a concrete lined excavation to protect both the equipment and live objects, animals as well as humans.

The pendulum bearing is attached to a piece of pipe secured to top of the concrete wall by bolts which were inserted before pouring the mixture. Heavy steel doors hinged to the cross pipe prevent children from lifting the covers out of curiosity.



Pit covers protect holddowns and lines from damage and reduce accident hazard on lease.

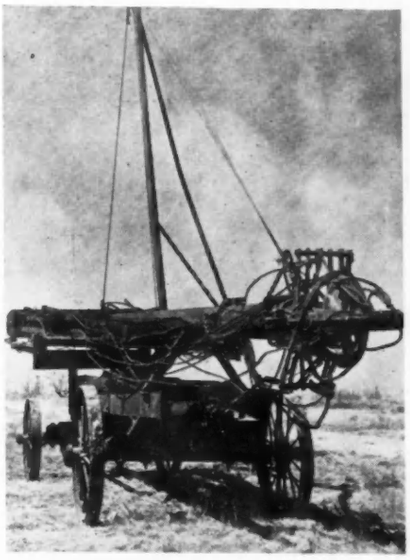
2. SERVICING

Wagon-mounted Mast Serves Shallow Area

HAVING the appearance of a sailboat on wheels, this pulling unit mast is attached to a carriage, safely constructed for mobility of the mast, yet equipped with steel rimmed wheels which thus eliminate the problem of obtaining hard-to-get rubber tires. The wells serviced by this unit are shallow and are concentrated in a relatively small area that is mud free. Under these conditions this carriage is ideal.

The auxiliary mast and rigging, used to raise or lower the main mast, provides the unit with its nautrical appearance. The rugged body frame is of box construction—formed by welding sheeting on the top and bottom sides of opposite angle sections. Power is provided by separate truck drive; the pulling load is taken by the earth upon which the raised mast rests. Guys on four sides provide stability.

The unit is sturdy enough to withstand hauling by lease service truck.



Standing gin pole assists in placing light unit, while steel wheels combat sand conditions.

3. GAS LIFTING

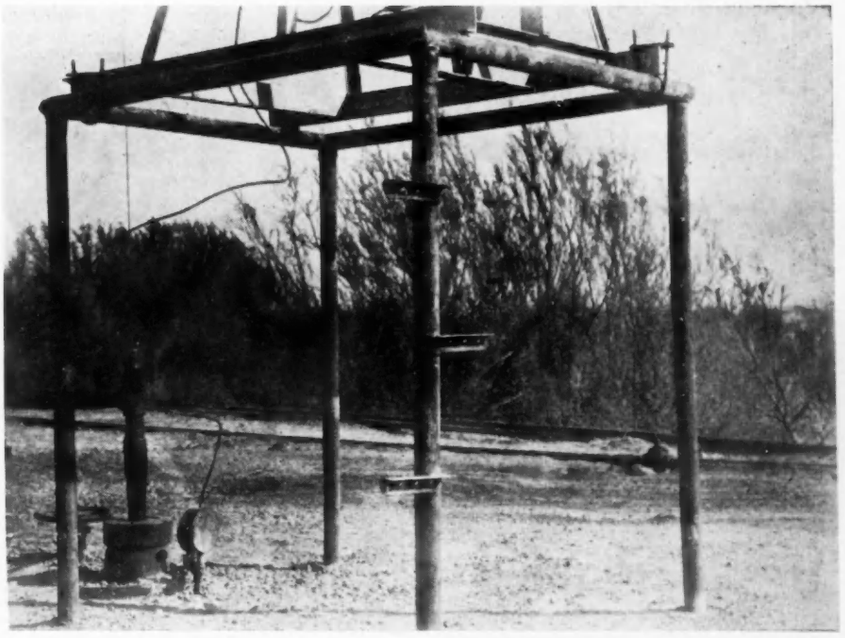
Elevated Platform Clears Flood Level

OIL often is produced from locations such as river banks which may be subjected to exceedingly high water during flood stages. On one particular river-bank lease, under water during the flood season, the operator has placed his light gas lift surface units on square, raised frame — such as shown. This raised frame is made from old two-inch tubing, welded at all joints and with risers set in individual concrete foundation.

The lifting unit is U-bolted to the frame which is large enough to facilitate maintenance work—yet no excess pipe is wasted in making it oversize. Short sections of angle iron, welded to one of the risers, provides a ladder for access to the unit.

The wide-set posts and well head are so located as to present minimum area for lodgment of floating debris.

The fact that this particular type of gas lift is not heavy and is free from vibration during operation makes such a light frame feasible. Operation on this



Light pipe frame carries actuating mechanism for gas-lift unit, removing equipment from hazard of floating debris and possible damage through mud deposits and water carried into mechanism.

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Casing Pumps

NEVER DUMPS FLUID

Oil is never dumped on the formation when producing thru the LAMTEX Left-Hand Packer Assembly. A permanent standing valve holds the fluid level when the working barrel or insert type pump is pulled for repairs. Much more efficient and economical than producing thru tubing — and you save 30,000 to 40,000 lbs. of steel.

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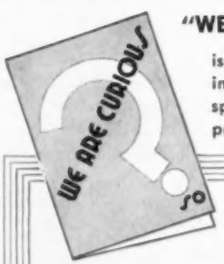
SEE COMPOSITE CATALOG



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Direct Entrance from Grand Central Terminal

lease continues even though the wellhead may be below the water surface, and will function as long as the gas compressor stays in service.

4. TANK PROTECTION

Arrestor Grid Traps Lightning Discharges

Flared pipe ends on unit at each break in direction form nodes for concentrating potential.

COMPLETE electric shielding of a high lease tank is provided by a pyramid shaped frame of old line pipe. The pipe frame, free of contact with the tank at any point, is based in three individual concrete foundations through which the pipe legs extend into the earth beneath to provide adequate grounding of any possible electrical charge caught by an arrestor.

At each shape change of the frame top, a fluted pipe extension has been welded upright to provide collection points for the electrical discharge—thus confining the lightning bolt to the grounded pipe, instead of any part of the wooden tank.

By spacing the crowned risers so as to avoid vents and possible gas flow, danger of fire is eliminated.

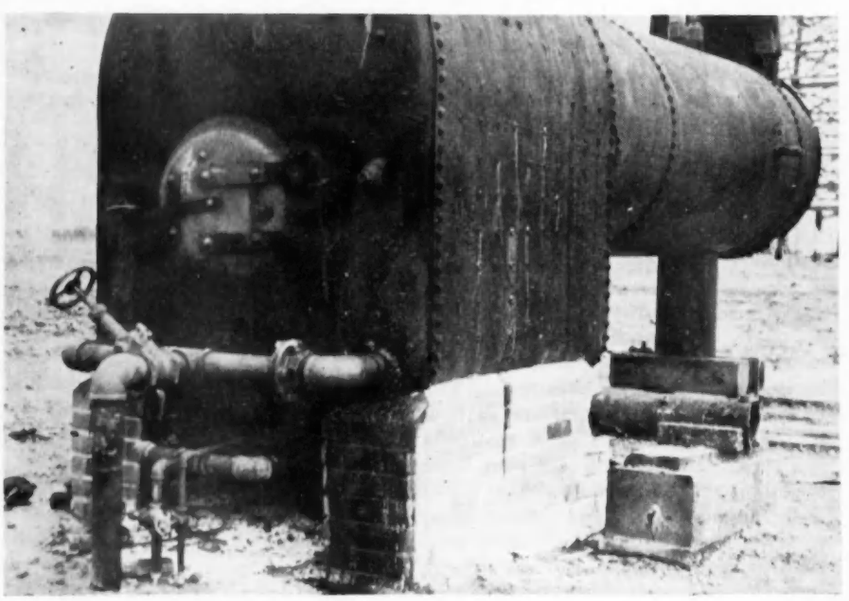
5. TREATING

Handholes Provide Dual Flow Passages

A CONVENIENT method of tying in the circulating lines to a boiler which has been converted to a heating unit for treating crude uses the lower, front-end cleanout openings in place of making new attachments. Since the fluid is at low pressure, oval covers are welded over the hand-hole apertures, each carrying a collar for the size of pipe used in the crude system.

By bringing the two lines together in front of the boiler, with a flange or other union on each leg of the loop thus formed, the unit may be cleaned in the usual manner if necessary, simply by disconnecting and using the short nipples then remaining as drain lines for flushing down the unit.

A tie-in such as this obtains maximum heating and uniform distribution of the effect by handling a divided stream at the base of the mud leg, thereby insuring against stagnant areas in the boiler, and loss of heating efficiency.



Welding covers and permanent collars at base of water leg give full sweep of incoming fluid across hottest portion of firebox and insure thorough heating to break down emulsions.

☆ ☆ ☆ ☆ WASHINGTON ROUNDUP ☆ ☆ ☆ ☆

Nelson Blames Aviation Gasoline Lag on Army-Navy; Ickes Says WPB Is at Fault

Senate Resolution Seeks $1.95 Per Barrel Crude Price

Several Special Spacing Rulings Will Be Issued Shortly

By B. F. LINZ
Washington Correspondent

☆ ☆ ☆ ☆

A documented showing by Petroleum Administrator Harold L. Ickes that the War Production Board's consistent refusal over a period of many months to grant priorities has slowed down the 100-octane-aviation-gasoline program and that current military needs for the fuel have been met only by resort to desperate expedients by the oil industry, marked hearings before the Truman committee which were the outstanding development last week in Washington.

An assertion by WPB Director Donald M. Nelson that slowness of the Army and Navy in developing their estimates, rather than the directive given Rubber Director Jeffers, was responsible for the lag in the gasoline program, was flatly denied by Ickes, who left with the committee the record of the appeals and demands made upon WPB for priorities without which new aviation-gasoline plants could not be put into production.

This week, the committee will hear Jeffers' side of the controversy, which arose when he criticised a report on the rubber situation issued last month by the Office of War Information, and will wind up its hearings with the testimony of Undersecretary of War Robert P. Patterson, who had charged that it was necessary to keep planes on the ground because of the lack of fuel.

A ban on rail shipments into Districts 1, 2 and 3 of heating oils originating in District 2 was imposed by PAW to release cars for navy contract and other essential uses. The ban will not affect shipments by barge or the rail movement from Mississippi or Ohio River terminals of oil originating in District 3.

Several additional supplements to PAO 11, one of which will cover automatic exemption from spacing rules for south Michigan and another for eastern Oklahoma and eastern Kansas are in the mill, probably to be issued within a few days.

At the Capitol, where the House was in recess and the Senate met briefly twice during the week, Senator Thomas of Oklahoma called for establishment of a price of $1.95 per barrel for crude oil, to place it on a parity with other industries and labor.

The gasoline situation also crawled into the limelight during the week when the Office of Price Administration raised the ceiling on driving outside the Eastern shortage area from 470 to 720 miles a month.

Apparently fearful of adverse reaction in the East, where pleasure driving is limited to 90 miles a month, Ickes immediately made known his determination to keep to a minimum the allocations on which OPA bases its mileage allowances in the shortage area.

Gasoline available for civilian use during May will amount to 356,000 barrels daily, he announced. While this is an increase of 23,000 barrels over the April figure, he pointed out, the excess will be sufficient only to take care of the farmers' increased seasonal demand.

All told, oil available to civilians will amount to 838,000 barrels daily during May as compared with 1,013,000 barrels last month. This will include 67,000 barrels of gasoline against 125,000 barrels; 140,000 barrels of heating oil against 286,000 barrels and 275,000 barrels of residual oil against 269,000 barrels.

As he disclosed that he had made his monthly certification to OPA, Ickes made public a telegram sent to the six New England governors explaining the impossibility of allocating more gasoline for motorists.

He also issued a formal statement asking motorists to understand that the government "has no wish to impose unnecessary inconveniences upon them, but that the ever-mounting requirements of the military for indispensable petroleum products makes it physically impossible at this time to supply motor fuel for civilian use beyond the requirements of necessity."

"Nothing would please me more than to be able to say—today—to all motorists: 'We are going to be able to give you more gasoline immediately.' But I can't say that—today," Ickes said. "Of this the public may be certain: when or if any relaxation is possible, it will be announced without delay."

PAW's weekly supply report showed that railroad-tankcar deliveries during the week ended April 25 averaged 922,870 barrels a day, a slight increase over the preceding week, but that shipments of kerosene in drums averaged 16,983 barrels, a drop of 3605 barrels. The total rail movement was 939,853 barrels daily, compared with 943,055 barrels during the week ended April 17.

Tank-car deliveries to New England were 175,398 barrels a day, down 4673 barrels from the preceding week, PAW said.

The tapering off of the heating season served to halt the decline of many weeks in the stock position, which was said to be unchanged from the preceding week.

OPA on April 29 set up an advisory committee of major oil company executives and retailer representatives to deal with East Coast rationing problems, the first discussions aimed at improvements in the coupon system.

The present system has a number of drawbacks, including the theft and forgery of coupons which has resulted in the creation of a widespread black market.

Army-Navy Slowness in Deciding on Needs Cause of Aviation Gasoline Difficulties

Present difficulties of the aviation gasoline program are not due to the green light given Director Jeffers for synthetic rubber plants but to the slowness of the Army and Navy in determining their requirements, the Truman Committee was told April 27 by WPB Director Donald M. Nelson.

Openly critical of "personal rivalries in time of war," Nelson declared that the rubber situation was the most serious of the competing rubber-gasoline-aircraft-shipping programs, and told the committee that if the question arose again he would make the same decision as he did last winter, when he gave high priorities to about half the rubber program.

The aviation-gasoline situation arose as early as July, 1940, he disclosed, when the National Defense Advisory Commission recommended creation of a 7,500,000-barrel storage of the fuel.

That suggestion was not carried out because of controversy among military leaders, he testified. The controversy continued into 1941, with the aviation gasoline that might have been stored going into commercial channels. It was not until June, 1942, that the aviation-gasoline program was raised to a high place on the priorities list, he said, explaining that the delay was because the Army "wasn't sure" of its requirements. Both Army and Navy, he said, originally were low on their estimates, although he emphasized the military authorities were doing their best to deal with the unknown factors that entered into the situation.

Rubber Most Critical

Nelson declared that the rubber situation was the most critical of all the situations created by the war programs, explaining, in response to a question, that the shortage of truck tires "is

causing trouble all over the country, and we have had to cut back the military program due to this shortage."

The danger of "rubber bankruptcy" is not over, although the situation has eased, he said, but he suggested that Jeffers be asked to answer questions on the relaxation of rationing regulations. All of the programs which are competing for the valves which are the underlying subject of controversy can be carried out this year, Nelson told the committee.

"Everything that can be done to expedite construction of plants for manufacture of high-octane gasoline will be done," he said.

However, he added, the high priorities for synthetic rubber had nothing to do with the current shortage of aviation gasoline alleged by Undersecretary of War Robert P. Patterson. It takes a year to 15 months to complete an aviation-gasoline plant, and any current shortage of supply results from decisions made a year or more ago, long before rubber was given the green light, he pointed out.

After the priorities were granted Jeffers, he said, he was informed by both WPB and PAW officials that if the entire synthetic-rubber program were halted the production of gasoline could not be increased. He admitted, however, that those priorities might interfere with aviation-gasoline production in months to come, but insisted that it would be possible to make up this deficit by proper scheduling of all the program.

Reluctance of WPB to grant the necessary priorities and failure of the Army and Navy to anticipate the volume of their needs have been responsible for the slowness with which the 100-octane-gasoline program has been translated into actual production, Administrator Ickes told the committee April 28.

Declaring that he was proud of his aviation-gasoline program, proud of his PAW experts and proud of the oil industry, Ickes declared that currently more 100-octane than the military agencies asked for is being delivered and that even the greatly increased requirements in June will be met. But, he indicated, from there on it will be a fight.

This record, he explained, was made possible only because as early as June, 1941, he foresaw the need for aviation-gasoline and by Pearl Harbor a definite expansion program was under way. In June, 1941, production was running around 24,000 barrels daily, and the then OPM took the position that we were in a comfortable position for at least 12 or 15 months, but should increase output by 25 percent over a period of 18 months. That, the administrator said, would have made a capacity of 50,000 barrels daily by the first of 1942, at which time, actually, PAW was aiming at an output of several times that figure.

Many Short Cuts

To get this volume, he related, many short cuts were adopted to develop maximum production from existing facilities.

"I could tell you of the perfectly staggering amount of study, planning, calculating and negotiating that went into the job," Ickes said. "But I shall not take your time with that. I do, however, want you to know that the job was done in the face of continuing and discouraging obstacles. It was done notwithstanding a really baffling lack of understanding, by many persons in high authority, of the vital essentiality of 100-octane."

Pressed to identify those whom he referred to, Ickes said, "I would almost have to give you a catalog of Washington. Some were military and some were naval, especially in the beginning, but in the final analysis we could not get new materials and there is only one source of new materials in Washington and that is the WPB."

Ickes said he was responsible for petroleum and nothing else, and "while we recognize the importance of the other programs we have considered that their advocacy was up to those responsible for them." Accordingly, PAW has continuously pressed its claims for material.

Not Far-Sighted

Admitting that the military services were not very far-sighted in their estimates of gasoline needs, the administrator said they are now on "our side," but it was not until May, 1942, that any requirements figure, and that semi-official, was procurable as to needs by December, 1943. Even that was based on a then obsolete plane program, and as late as last September there was no official long-range figure available for 1944. PAW made its own calculations, always much higher than the military's estimates, and has consistently been ahead of the services.

"I wish to emphasize that the petroleum industry, under the guidance of PAW, will produce this month more fuel every day than the official requirements figures extant last July indicated would be necessary at this time," he said. "Further, I venture the opinion that in July of this year—obstacles or no obstacles—we will be producing more fuel every day than the best estimators had believed, a year ago, that we should need by now—or even by next winter.

"However, in accomplishing these objectives we did not have the help with construction materials which we had to have to carry out our program."

Although he explained that it took a year or more to build plants and materials should be provided with that in view, WPB never called him into consultation when framing its plans and he was not consulted on the rubber program until it was almost perfected. He fought against the directive giving Jeffers 55 percent of his program, but accepted it once it was issued, he said.

Plants Built

In December, 1941, there were 23 major 100-octane units in the United States and Aruba. By July of the following year only one additional plant had gone into operation, but by last December the total had increased to 32. Now, there are 42 such plants, but had it not been for the conflict with other programs the number today would be in the neighborhood of 50.

The preference directives given the rubber plant resulted in a loss of 4,413,600 barrels of aviation-gasoline which PAW can prove and a further loss not susceptible now of precise demonstration. Had not the rubber directive been made less drastic than originally contemplated and had not PAW and the rubber director cooperated in breaking bottlenecks, the loss would have been 9,000,000 barrels.

Specifically, Ickes said, the "wallops" that the aviation-gasoline program has received included the following:

"First, we did not receive any steel plate for the new plants until March, 1942, and then it was delivered in a harum-scarum manner without regard to the needs or relative urgencies of the separate projects.

"Second, while we persuaded WPB to let us allocate the steel plate in May, 1942, and never had a bit of trouble with that thereafter, we were unable to persuade it to let us allocate the other materials, largely I believe, because that would have been contrary to the then current theories of the board which revolved around priorities rather than scheduling.

"Third, in the summer of 1942, the then authorities actually voted the aircraft-production program and certain other military programs as of higher urgency than the program to produce fuel for combat planes.

"Fourth, in the early fall of 1942, we endured more than a month in which all rubber projects were rated higher than all 100-octane projects.

"Fifth, while in December, 1942, we finally attained the mandatory scheduling of parts for certain plants, the directive which was then issued had to be shared with the rubber program.

"Sixth, we were denied a similar mandatory directive covering the plants scheduled to be finished in the second quarter of this year—and, in addition to failing to receive such help, we suffered a positive hindrance in that the rubber program did receive such a directive."

"Not Making Too Much"

Ickes charged that he made "some 30 separate demands" for help to WPB with little result, until it approved 20 percent of his program last December. On April 19 of this year, he said, it acted to schedule construction of the remaining plants in the program—an order which should have been issued in January or February so that the shops would be prepared for it.

"We are not making as much 100-octane as we wish we were making," he told the committee. "We are not making as much as we need."

Asked by Senator Truman whether the several war agency heads consulted each other on mutual problems and whether there was any cooperation among them, Ickes said there were few moves in that direction. "I am the best cooperator in Washington—when I can have my own way," he volunteered.

Seeking to find out if the situation now was satisfactory, Senator Burton asked when WPB's April 19 order improved the situation. Ickes admitted that it had been a help, but said it was still far from satisfactory and that "high-octane production should have a clearer road than ever before," adding that "better scheduling, particularly at lower levels" could improve the situation.

"It isn't working satisfactorily, and you can not get me to say it is," he told the Senator.

Senate Resolution Calls For Crude Price Increase

An immediate increase in the price of crude to $1.95 per barrel is called for in a resolution introduced in Congress April 26 by Senator Thomas of Oklahoma, to give producers "a parity price with industry and labor."

The resolution, if adopted, would not be binding upon the administration, but would express "the sense of the Senate that the federal agencies having control of price ceilings should take immediate action to raise the ceiling price on oil to such a point as will be instrumental in promoting oil exploration, development, discoveries and production of sufficient oil to serve the war effort as well as the necessary domestic needs of our people."

The $1.95 price represents the level which oil should find on the basis of the average of $1.88 per barrel which prevailed during the period from 1919 to 1929, and the increase of present prices for other commodities and labor over that period.

Thomas summarized the points made before the Patman little-business committee which last month investigated the situation, reciting that the present low price for oil is forcing the little producers and operators to sell their properties and discontinue exploration, resulting in oil properties being concentrated in the ownership and under the management of the big companies; is forcing stripper wells to close; is handicapping the development of secondary recovery operations, and is making it impossible to secure financing for prospecting and drilling.

Complaint Procedure Simplified by PAW

Procedure for the investigation and handling of violations of oil orders and directives has been simplified by PAW, bringing the practice of the agency into conformity with that of WPB.

Officials emphasized that the change in procedure is designed merely to speed up the handling of complaints and was not due to any increase in the number of violations which, they said, have been comparatively few in the past.

Under the new plan, a non-compliance proceeding will start with a letter from the PAW compliance section, outlining the known facts to the company or operator who is believed to have violated a PAW order, directive or regulation.

The company or operator will be permitted either to reply in writing or present the facts at a conference before a commissioner appointed by PAW.

If a conference is requested, the commissioner will hear the presentation, and prepare a report of the facts for the compliance section, the company or operator being given a copy of the report and the right to make any reply he deems necessary.

When all facts or arguments are presented, the matter will be submitted to an assistant deputy administrator, who will review the file and make a recommendation to the administrator or the deputy administrator.

If it is determined that no violation exists the company or operator will be notified immediately. If a violation is found to have been committed, an appropriate suspension order will be issued which may contain any one of the following penalties:

Withdrawing or withholding priorities assistance; withdrawing or withholding allocations of scarce materials; prohibiting the respondent from delivering, receiving, using or otherwise dealing in specified scarce materials or products, or providing for such steps as may be found necessary and appropriate to accomplish the purpose of the executive order setting up PAW.

Actual Work Starts On 20-Inch Line

The start of actual construction of the 20-inch products line from Texas to the East Coast was announced by PAW April 26.

The first crew to start laying the line was that of the Williams Brothers Corporation, which started roll-welding pipe on the south bank of the Arkansas River near Little Rock, but most of the other contractors also have some equipment on the ground and are preparing to begin operations.

Tubular Goods Limited to Simplified Sizes, Weights

Moving to assist in meeting increased demands for oil country tubular goods, WPB on April 30 issued a "simplification schedule" cutting in half the number of permitted sizes and specifications.

Specifications for steel products limits the production of oil country tubular goods (casing, tubing and drill pipe) to a list of 168 items, based largely on a simplified list developed some time ago by the American Petroleum Institute. Formerly, more than 300 items were produced by the industry.

The schedule is expected to result in a tubular goods production increase of about 15 percent and ease the burden placed on mills by requirements for pipe lines, munitions and other essential equipment.

The term "oil country tubular goods" means oil well casing, tubing, and drill pipes, the schedule makes exceptions for oil well casing produced by electric fusion welding: for orders entered prior to April 30, provided delivery is made before June 30; and in certain cases, for items with special thread dimensions or types of joints.

Old Ocean Spacing Again Aired in Washington

Difficulties encountered by owners of small tracts in the Old Ocean, Texas, field in securing authority and materials for drilling were outlined April 27 before a House Naval Affairs Subcommittee which for several weeks has been engaged in an executive investigation of the oil situation.

John B. Dailey of Houston, owner of a 20-acre tract, testified before the subcommittee regarding his difficulties with the state and national governments as a result of strict enforcement of the 40-acre rule.

Dailey said that although he has been authorized by the Texas courts to drill his property, he has been trying unsuccessfully for 16 months to obtain permission from PAW. The spacing rule, he said, has resulted in the isolation of his land, though wells have been drilled all around it.

He told the subcommittee that he had made offers to several federal agencies, including the War and Navy Departments and Defense Supplies Corporation "to drill the property and produce 200,000,000 barrels of oil, more or less, and sell it to the government at 25 percent under the basis of the Defense Supplies Corporation contracts with the surrounding oil interests."

Jeffers Sees Rubber Plants in Southwest

Estimating that the 1943 production of synthetic rubber will be 250,000 long tons and predicting that civilians will be able to obtain tires by mid-summer of 1944, William M. Jeffers, national rubber director, inspected basic rubber plants in the Southwest last week.

Jeffers first visited the plant at Baton Rouge, Louisiana, and then toured operations on the Texas Gulf Coast, optimistic over the progress that has been made and figuring that the building program is approximately 70 percent finished.

The director stated that the time may not be too far off when the Southwest may be producing the basic synthetics in quantities comparable to Malaya in its crude rubber output.

Navy Develops Concrete Storage for Gasoline

Problems involved in the use of concrete for the storage of oil have been overcome by the Navy, which currently has a building program of more than 2000 tanks varying in size from 25,000 to 2,520,000 gallons capacity.

The primary purpose of adopting concrete was to save steel, but it was found also that at points remote from steel mills concrete was cheaper and quicker to handle. Steel tanks of a prefabricated, demountable type, however, are used at advance naval bases.

So well have the problems which formerly rendered concrete unsuitable been solved that even high-octane gasoline is now stored in them without loss. All of the concrete tanks are being built underground, with four feet of earth cover upon which natural vegetation is planted to conceal them from enemy air observers and safeguard them against incendiaries and shrapnel.

In the past, the department explained, concrete has had two disadvantages which militated against its effective use for liquid storage—a disposition to develop cracks through changes in temperature and the porosity of the concrete itself—which resulted in losses.

To counter the first of these disadvantages, the Navy adapted pre-stressed concrete to its use. To offset the second, the Navy, in cooperation with industry, developed various types of linings for the tanks which in effect form an envelope containing the stored fuel.

For storing heavy fuel oil, it was found that all that was necessary was to paint the inside of the tank with waterglass which, together with the wax in the fuel, sealed the pores.

For diesel oils and gasoline, three different types of lining materials were developed.

Acute Production Problems Studied By API

By FRANK BRIGGS, Staff Writer

HIGHLIGHTING problems of manpower shortage, supply and conservation of critical materials, the Spring Meeting of the Southwestern District Division of Production of the American Petroleum Institute was held April 29 and 30 at Houston. Meeting after a year and a half of producing operations under wartime requirements and limitations, the gathering looked back at the road traveled and found the progress satisfactory, reviewed many of the newer practices and, glancing ahead, foresaw the increasing problem of manpower as the major future obstacle to overcome.

Selected to head the Southwestern District for the coming year, D. V. Carter, Magnolia Petroleum Company, Dallas, was elected chairman of the group. Fred Shields, Shields Oil Company, San Antonio, was elected vice-chairman for the Texas Gulf Coast; R. Kyner, East Texas Engineers Association, Kilgore, vice-chairman for East Texas; J. W. House, Humble Oil & Refining Company, Midland, vice-chairman for West Texas; C. F. Patterson, vice-chairman for North Texas; M. L. Euwer, Union Sulphur Company, Sulphur, vice-chairman for South Louisiana; V. J. Martzell, United Gas Pipe Line Company, Shreveport, vice-chairman for Arkansas and North Louisiana; Geo. H. Card, Stanolind Oil & Gas Company, Ft. Worth, vice-chairman for North Central Texas. A. W. Baucum, The Texas Company, Houston, was elected secretary-treasurer.

Aside from selection of new officers, the extremely great responsibility placed by the Nation upon the petroleum industry was voiced by speakers and seriously received by members in attendance. The two day meeting was divided into four sessions: the first involved general discussion and reports of various units; the second brought out vital problems of material conservation and supply. Drilling and production practices and the most important problem of manpower occupied sessions of the second day.

Outweighing even the major problem of materials, the question of sufficient and trained manpower for continued efficient operation of the production branch of the industry was given prime consideration. Addressing the meeting on the Government's View of Oil and Gas Industry Manpower, Henry LeBlanc, Acting Regional Director for the Manpower Commission, asserted:

". . . A total labor force of 62½ million (persons) will be required this year; 10½ to 11 million men will be in the armed services by the end of 1943; 2½ to 3 millions will be employed in agriculture; 18 million women will be employed in all types of work by the end of the year." Aside from the needs for manpower of the various national endeavors, LeBlanc told the gathering that the oil industry would continue to lose its trained personnel and must make plans for suitably training workers for diversified jobs as well as utilizing women and persons physically handicapped. Available training facilities, and how they could be put to universal use by the industry, were described by J. R. D. Eddy, of the Texas Board of Education. Harry H. Powers, School of Petroleum, University of Texas, presented the industry's case in describing the Technical Manpower Needs for Oil Production.

Abstracts of papers follow:

Oil's Wartime Achievement in Transportation

By T. E. SWIGART and H. H. ANDERSON, *Shell Pipe Line Corporation*

The industry has been faced with a tremendous overland transportation problem as a result of wartime diversion of tank ships from the Gulf-to-East Coast run. During the first half of 1941, tank ships alone delivered into the Atlantic Seaboard states, so-called "District 1," about 1,450,000 barrels daily of petroleum—an amount that was more than 93 percent of all movements into that district. At present tank ships are delivering little or nothing over this run.

To make up this transportation loss, tank-car movements into District 1 have been increased from negligible quantities to over 800,000 barrels daily. Barge deliveries into the district have built up from 54,000 to about 200,000 barrels daily, and tank cars and barges together are now delivering more than 1,000,000 barrels daily of crude and products from the Southwestern, Mid-Continent and North Central states.

The pipe-line expansion program has been little short of phenomenal in view of the rearrangement and construction required. Increasing from about 45,000 barrels in 1941, pipe line deliveries of crude and products into District 1 will reach 500,000 barrels by the end of 1943. Upon completion of the War Emergency 20-inch line, they should exceed 600,000 barrels.

District 1 demand is a military secret because it now includes provision for offshore shipments to our armed forces and Allies in the northern theater of war, but it may be concluded that the total demand is equal to or greater than the 1,600,000 barrels daily required immediately preceding the war. Available transportation methods now are delivering more than 1,250,000 barrels daily without any tank-ship movements. Operation of the two War Emergency Pipe Line projects, together with further improvements in industry-owned lines, should raise the total deliveries to District 1 by inland and overland carriers to more than 1,600,000 barrels daily by the end of this year.

Much praise is due the industry for the successful accomplishment of this program, and to the railroads for their fine cooperation in handling the tank car movements. Full credit as well is due the Petroleum Administrator for War and his staff who have correlated and directed this program with the greatest of energy and understanding of industry problems, and the personnel of other government agencies and branches, including the Office of Defense Transportation, the Army, Navy, Maritime Commission, War Production Board and Reserve Finance Corporation, who have done their part to make the program a success.

Prior to Pearl Harbor the accomplishment of this program would have taxed the credulity of the most imaginative mind, and it is safe to say that when the industry's wartime history is finally written, its transportation record will prove to be one of its most important, if not outstanding, achievements.

Wartime Protection of Petroleum Facilities

By KRAUS EARHART, *Director Facility Security Division, Petroleum Administration for War*

We need today a maximum production of all industry, but with an absolute minimum expenditure of the materials and manpower for which there is a pressing war demand. Quite obviously, this can only be obtained through utilizing to the utmost the resources at hand, without restriction imposed by incidents and accidents causing loss of production.

The Continuous Security Branch of the Internal Security Division, Eighth Service Command, is now charged with the responsibility for the continuing protection of all petroleum facilities in the Gulf Coast Region which are considered essential to the war effort.

The Facility Security Division of the Petroleum Administration for War will work with the Service Command in handling facilities on the Army Responsibility List. Original inspection of these facilities will be made jointly by representatives of the Service Command and the PAW.

The work of the FBI, the Internal Security Division of the Army, the Coast Guard, the Army and Navy Intelligence Divisions is deserving of high tribute by the American people. Superintendents, foremen, supervisors and loyal workers have developed a formidable wall against the enemy in curbing sabotage.

Today every fire is sabotage. Every fire that destroys a single item of war material or machinery makes it that much easier for enemies of freedom to kill and maim the fighting men of the United Nations.

Our present day vital need is vigi-

lance by workers in all phases of the petroleum industry and your specific ideas for fostering a special alert in the minds of all your people all of the time is urgent. Every worker must understand that more rigid regulations are imposed because they are necessary and will have to be adopted because our American way of life and our armed forces fully warrant this protection. Every employe must be positive that all persons on the premises belong there, whether in uniform or in civilian clothes.

A.P.I. Standards—Past and Future

By J. F. Lucey, *Lucey Petroleum Company*

The purpose of this paper is to broadly appraise the standardization program of the American Petroleum Institute, which since its inception 20 years ago, has rendered great help to the industry. Total footage drilled in 1940 was 94,000,000 feet, at a cost of something in excess of $6.00 per foot, or a total of approximately $600,000,000. The same wells 20 years ago would have cost $10.00 per foot or approximately 1,000,000,000. As a matter of fact the wells of today could not be drilled with the equipment available 20 years ago at any cost.

Drilling is one example of the savings rendered by the standardization program, conceived and carried through by the American Petroleum Institute.

Twenty years ago sucker rods were not interchangeable and often the rods produced by one manufacturer one time would not fit those produced by the same manufacturer at another time. Today these difficulties no longer exist. Probably only the manufacturers are really aware of the high precision required to produce API sucker rods today.

Standardization procedure has also been made in cable-tool joints, derricks, rotary joints, boilers, casing tubing and drill pipe, wire rope, steel tanks, etc.

Materials for the Production of Oil Through the Controlled Materials Plan

By David G. Hawthorn, *Production Division, Petroleum Administration for War*

The fundamental purpose of the Controlled Materials Plan (CMP) cannot be stated more clearly than by quoting from the first description of the plan: "The plan is to assure the balance between supply and demand of controlled materials to the end that such materials shall be available in the quantity and form and at the time required to meet authorized program schedules. CMP provides for the division of available supplies of controlled materials among the various claimant agencies in the interest of most efficient use of these materials in war production."

Basicly, the plan seeks to effect rigid control over the distribution of the most vital and critical materials of war production to the end that if this step is successfully accomplished, all other problems incident to the correlation of supply with demand would fall in line.

Fabricated products have been divided into two classes, A and B. An arbitrary definition of Class B products made in the "official CMP Class B products list" and a Class A product is any product that is not on the Class B list. PAW is the claimant agency for the petroleum industry. It holds the unique position of being both a claimant agency and an industry division. Under CMP there are nearly 500 manufacturers who file forms with PAW to apply for controlled materials for use in the fabrication of various and sundry Class B products, flowing into the petroleum industry. Under the plan it is necessary that each claimant agency and each industry division, requiring quantities of controlled materials, make quarterly submissions for their needs to the requirements committee of WPB.

Operators have never been accustomed to projecting their needs and in the case of the small operator this is not practical. However, it appears necessary to call upon the industry to go at least part of the way so as to contribute in every possible manner to the success of CMP. Operators who drilled more than 40,000 feet of hole in 1942 may be required to anticipate their needs for controlled materials in the form of tubing, casing, line pipe and drill pipe, according to a plan now contemplated. From a study of the drilling records of 1942, it has been determined that this will involve about 100 operators who were responsible for approximately 50 percent of the footage drilled during that year.

PAW is earnestly endeavoring to secure for the industry its necessary supply of materials and equipment, to the end that the industry will be able to fulfill to the utmost its obligations in the war program.

The Conservation of Steel in Oil Production and Transmission

By V. J. Martzell, *United Gas Pipe Line Company*

The oil and gas industry is paradoxical; to a man the industry stands for the conservation of one of the products of the mine (oil and gas) but is guilty of dissipating another natural resource —steel. The channels of conservation of steel are numerous—too numerous to be presented in a short paper, but some of the few vital, and proven, means will be of interest here. The conservation program in the Arkansas-Louisiana-Texas Area has fallen into the following four categories:

In the first category, the conservation of steel is accomplished by the substitution of items, either new or used, which are already on hand in warehouses for items of similar make which would have to be purchased new. This calls for a policy change: instead of planning warehouse stocks to fit projects, projects are now planned to fit the warehouse stocks. The standards are changed (not lowered) to utilize stock formerly obsolete.

The second method of steel conservation is through use of items other than steel in field operations. There are numerous opportunities where material other than steel may be used in the oil industry. For instance, concrete river weights, used to anchor pipe under water, may be substituted for cast iron. Operating structures, built of corrugated iron with steel frames, can use wood on frames. One phase of this conservation that has been used successfully is that of substituting concrete counterweights for steel on pumping units.

The third method of conservation is not a new one because it has been used as an economic measure for years, but research and far reaching improvements have brought it into the light of one of the most important conservation measures; it is protection and preservation of existing steel equipment. In the case of line pipe alone, new coatings have been developed recently that greatly

Elected by API Southwest District

A. W. Baucum, secretary-treasurer; D. V. Carter, chairman, and Fred W. Shield, chairman, Texas Gulf Coast District.

extend the life of the pipe. The field of electrical protection of pipe is only in its infancy but already it has proven very successful in pipe-line protection. Material not in use should likewise receive careful attention to avoid deterioration; idle equipment must have periodical reconditioning, painting and lubricating.

The fourth method of conservation of steel falls under the heading of salvage. Used material is not necessarily worn out; it may be used again under less drastic requirements to meet its deteriorated abilities. All pipe should be cleaned when taken from the ground, tubing steamed to remove paraffin adhering to the walls—casing sandblasted.

API Activities and Cooperation With the War Production Board In the Simplification of Steel Specifications and Steel Conservation

By C. A. Dunlop, *Humble Oil & Refining Company*

The standardization committees in the Division of Production have been actively engaged in cooperative war efforts, as by the simplification in and the reduction of material lists to facilitate manufacturing operations, and in the lending of its members to WPB to staff many of the committees drawing up emergency steel specifications. Three organizations, ASTM, the SAE and AISI, were called upon by the WPB to form these emergency specifications committees to aid the iron and steel branch in administering steel priorities. Technical advisory committees designated from the three societies began functioning in April, 1942, and they were instructed to select, as promptly as possible, a list of steel specifications from those promulgated by the Army and Navy and others with a view toward adopting a minimum number of steel compositions and sections suitable for requirements of national defense.

The API Division of Production has actively cooperated by lending representatives to these various steel specification committees, numbering seven.

The Tubular Steel Products Committee, Oil Representative Section 4, recommended API Standard 5-A, "Casing, Drill Pipe and Tubing," and 5-L, "Line Pipe," as well as ASTM specification A-139, "Spiral-Welded Steel or Iron Pipe," for adoption by WPB. The Advisory Committee for Structural Steel Shapes recommended ASTM specification A-7 and A-94, the committee on Carbon and Alloy Steel Plates recommended (and had accepted) ASTM standards A-7, A-10, (tank standards) 12-a and 12-c. To date no committee has been designated to select a list of minimum specifications on steel wire and wire products.

The standardization work of the API began in 1919 and is handled by 10 national committees. The activities of these committees as related to or influencing the war effort may be summarized as follows:

The belting committee feels that industry is provided with adequate belting specifications and recommends no change at present. The committee on boilers has set up the API standard which provides a limited range of sizes and refers to the ASME Boiler Code for details of construction and quality of material. No further action on the present standards for cable tools is contemplated by the responsible committee.

The committee on derricks has inaugurated three studies: the simplification of derrick sizes, the simplification of pumper-structure sizes and the establishment of standard dimensions and minimum load requirements of portable drilling and production masts. The tubular-goods committee made recently these changes: Simplification of casing lists, reducing the number of items from 250 to 95, simplification of plain-end line pipe lists and a reduction in the elongation of grade J-55 casing. They also will permit the manufacture of electric-weld casing, tubing and line pipe from acid-Bessemer steel, from open hearth iron, or line pipe from electric furnace steel. Other recommendations were made.

The rotary drilling equipment committee previously reduced the number of tool joints from several hundred to seven standard dimensions. Aside from a simplification of wire-rope sizes, the committee on wire rope and manila cordage is now conducting a survey to determine action on specifications.

The pumping-equipment committee has investigated steps for reducing raw stock 50 percent by simplification of sucker-rod and polished-rod specifications. Studies are in progress for limiting the range of sizes of speed reducers and for the field care and use of counterbalances.

Use of Materials in Secondary Recovery

By Paul D. Torrey

Large but little recognized, secondary reserves exist in the United States which are available to augment the primary reserves. The development of the secondary reserves usually involves a minimum of new materials, it frequently being possible to utilize the existing production facilities and wells.

In giving consideration to the availability of secondary reserves as an assistance to the war effort, it should be kept in mind that only about 40 percent of the presently estimated secondary reserve of the United States can be produced profitably under existing price schedules. The necessity for an increase in crude oil price to prevent abandonment of thousands of stripper wells, to stimulate exploration of new fields and to encourage development of the proven deeper producing horizons, has been emphasized time and again by leading petroleum authorities.

Continued reduction in the quantity of materials available to the industry cannot help but be appreciated by anyone engaged in drilling wells. It is notable that many secondary-recovery operations can be developed in large part by use of existing facilities. Old wells can be rehabilitated and surface equipment repaired. Aside from the obvious means of care and maintenance there are other methods of an operational aspect that use materials to ultimately save material. For instance, the prevention of corrosion, by application of small, proven devices such as insulated flanges, will save in the long run.

Another operational device that conserves is the application of flowing methods in water flooding thus tending to reduce the amount of surface or subsurface equipment commonly required to lift oil to the surface. Also the unitization may afford great savings in materials and in operating expense by elimination of multiple compression or pumping plants, and distribution of gathering systems.

Development and Control Of Oil Reservoirs

By S. E. Buckley and R. C. Craze, *Humble Oil & Refining Company*

Technologists have classified oil fields according to the following categories: (1) dissolved gas drive, (2) gas-cap drive, and (3) water drive. Each of this type of drive effects differently, over a period of producing time, such indicative well characteristics as reservoir pressure, gas-oil ratio, percent recovery.

It is most desirable to identify a new field according to drive, then develop it so that full advantage will be made of and the greatest possible control exerted over this drive. The main aspects of proper field development involve a sufficient number of wells to adequately explore the area, well completion made in such a manner as to exclude free gas and water, sufficient producing section to yield oil at reasonable rates, selection of proper mechanical devices such as screens, etc.

The control of reservoir performance involves the rate of production, the amount of free gas and water produced —all factors that usually can be controlled by surface connections or down-the-hole work-over jobs. However, it should be pointed out that the production of water becomes wasteful only when it reaches such proportions as to interfere with the successful operation of the water drive.

The formation pressure may be maintained by two methods: water or gas injection. Gas may be returned to the reservoir to increase production in one of two ways: to modify the drive of dissolved gas and thus increase ultimate recovery, to control the amount of free gas produced. In water-drive fields that have an excess of water, return of water to the formation does not contribute to ultimate recovery; in those fields that lack water, such a return permits a higher rate of oil production at the same pressure level.

[*For text of this paper see page 11.*]

Removal of Paraffin Accumulations in the University Field

By Benjamin C. Craft,
Louisiana State University, Department of Petroleum Engineering, and
R. F. Nichols,
Superintendent, Grubb & Hawkins

One of the first major production problems in the University oil field was formation of paraffin in the tubing, wellhead connections and flow lines. It was found that flow-line pressures could be reduced either by the use of solvents, steaming or heating the line in a shallow bell hole. Analysis of conditions responsible for the heavy deposits in the tubing, starting at 2500 feet, failed to develop production practices which would minimize the paraffin problem.

The first improvement (on existing paraffin cutters) was the development of a long-shank, circular cutter with 12-inch shanks, 1 inch wide.

To overcome the objections to this knife (of the removal of paraffin in large

chunks and of long cutting time) a new knife was developed. The body consists of a ⅝-inch cold-rolled steel shaft which is drilled with 3/32-inch holes for the wires and tapped at right angles for Allen set screws. The scratchers are made from .092-inch mild-plow-steel wire, cut 2¼-inches long for 2½-inch tubing. The two semi-circular knives at the top are made of spring steel, are sharpened on top and bottom edges, and provide an open passage for the flow of cut paraffin and the well fluid.

This tool eliminates all the undesirable features of the circular knife or biscuit cutter. The scratchers loosen and break the paraffin into small chunks from the wall of the tubing and any accumulations remaining are removed by the overlapping circular knives. The paraffin is then, even at low rates of flow, carried up the tubing, with no danger of plugging the choke.

If the average reduction in cutting time of 75 percent achieved with this knife is applied to the East Texas field, where during 1939 a total of 4791 wells were scraped by 8 companies with an average of 146 minutes per well, there would result a saving of 8,743 hours.

It is also believed that the new scraper can be used effectively on wells which are produced by gas-lift with flow valves actuated by a wire line and controlled by a surface-regulator intermitter. In this type of installation, the wire-line socket, sinker-bar, jars and inverted scraper would be placed just above the weight bar. By withdrawing the string of tools at regular intervals, before the paraffin accumulations become too heavy, no trouble should result from sticking the scraper or obtaining excessive amounts of paraffin in the bottom of the tubing while the well is off production.

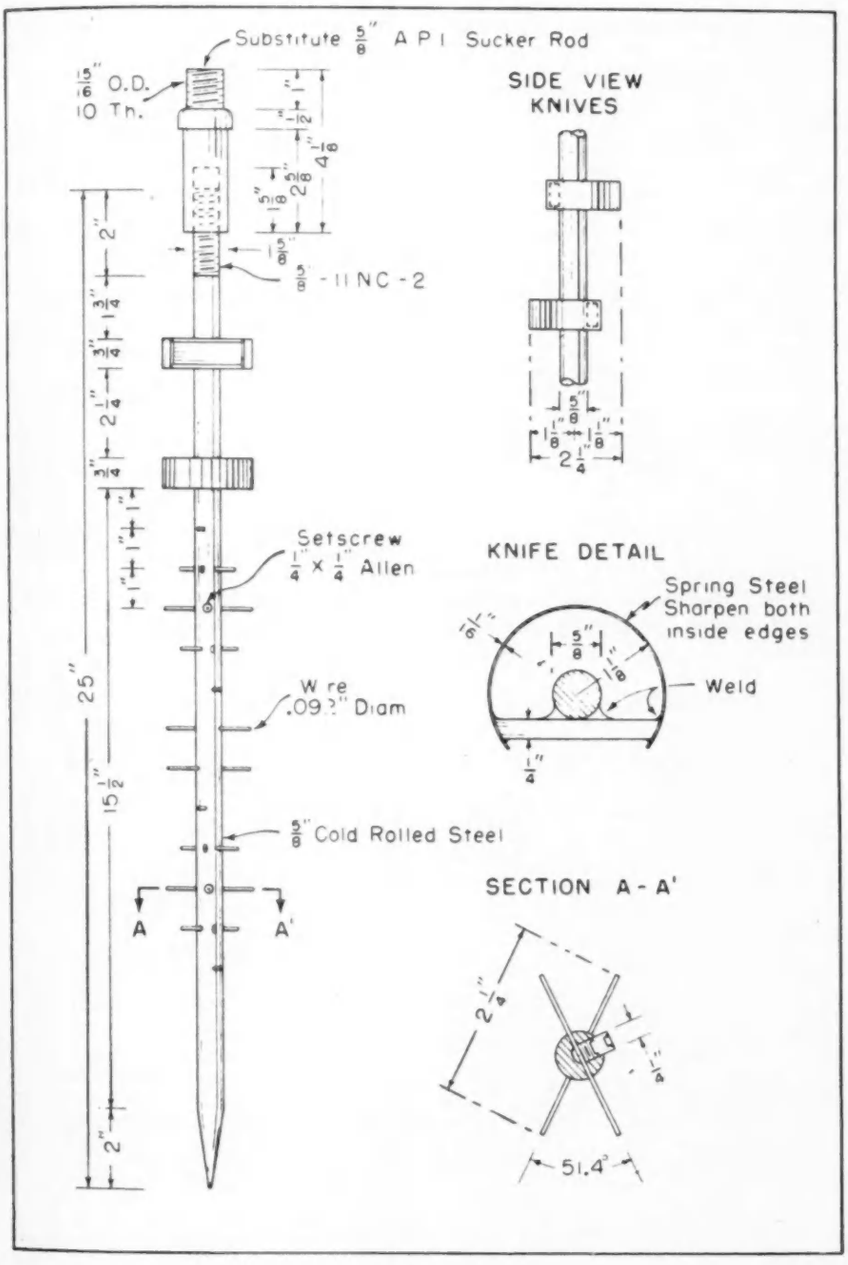


FIGURE 1
New type of wire-line paraffin cutter.

Operating Features of the Katy Gas Cycling Plant

By Frank G. Noble, *Natural Gas and Gasoline Department, Humble Oil & Refining Company*

Operators in the Katy gas field, 40 miles west of Houston in Harris, Waller and Fort Bend Counties, agreed to unitization of their properties with the idea of installing a cycling plant to process the produced gas and the reinjection of the residue gas into the producing sands. This was in 1939; the plant is partially completed.

Recent trends in design of most gas cycling plants have been toward large processing capacity, usually 100 to 200 million cubic feet of gas per day. After considerable study, it was decided that a plant of 275 million cubic feet of gas processing capacity would permit economical processing over a period of 20 to 30 years; the Katy plant was designed with this capacity. Recovering an estimated 80 percent of the potential butanes, and practically all the heavier hydrocarbons, approximately 235 million cubic feet of gas per day to be processed will enter four high-pressure absorbers operating at 1,800 pounds per square inch. The absorber residue gas, approximately 210 million cubic feet per day, will be returned to the gas-engine driven compressor units for reinjection into the formation. The plant at rated capacity is expected to recover approximately 7,500 barrels per day of total products: 1,661 barrels of butanes, 2,689 barrels of gasoline, and 3,164 barrels of naphtha and distillate.

The gathering system is designed to take the unit's gas from 15 producing wells—3 of them dual completions. The lines are sized for a maximum daily production 20 million cubic feet each from the edge wells, 25 million feet from the single-sand wells and 40 million feet from the dual-completed wells. This gathering system is designed for working pressures up to 2,700 psi at 130° F. The injection system is designed for a working pressure of 3,500 psi at 175° F. [*For full text of this paper see page 17.*]

Construction and Economic Significance of Direct-Current Rigs For Deep Drilling

By Dr. A. J. Dawson, *Office of Petroleum Administration for War*

Electric rigs can enter into competition with other mechanical rigs in shallow drilling only if certain conditions are favorable, but beneath 11,000 feet electric power affords a load distribution more inherently advantageous than other power drives.

Large electric rigs must definitely be tailor-made of the very best available equipment. This must be done with care. But given sufficient design, prime mover horsepower, and electric power, direct current rigs can compete economically with steam to depths of 15,000 feet.

To drill to 13,000 or 15,000 feet an electric rig should have at least 1000 horsepower, as far as the brake horsepower ratings of its prime movers are concerned. This amount is the minimum necessary if full mechanical and electrical flexibility is obtained. The load should be divided equally between the prime mover engines, which should be at least three in number, each being from 330 to 500 brake horsepower. With triple units of this kind, sufficient power is available to drill with two engines,

and the drill pipe may be withdrawn by a single engine if the well is not deeper than 11,000 feet. In like fashion the generative units should be large enough so that each may accomplish its appointed task without any aid from any other electrical equipment. Generators for a large electrical rig should be at least 300 and preferably of 350 volts in order to obtain proper balance between speed and torque with the generator ratings.

Technical Manpower Needs for Oil Production

By Harry H. Power, *Department of Petroleum Engineering, The University of Texas, Austin*

Technical manpower in the oil industry is as important and should be given as much consideration as the technical manpower in any other war producing industry if our maximum effort in this emergency is to be made effective.

Nearly one-fifth of all the registered professional engineers, from all industries, are in the armed forces, with another 12 percent in governmental positions, and a further 10 percent in transportation and utilities posts. The War Manpower Commission says an increase of at least 25,000 in the total number of engineers employed, both in the armed forces and in civilian life, would be desirable.

The oil industry has seen thousands of technical workers volunteer for military services. The critical point has been reached, beyond which forces cannot be reduced without real harm to the producing operations.

Full use of all the engineering students available after the demands of the armed forces would not meet the demand for replacements in essential industries. Specialized training under Army and Navy plans which will be effective July 1 does not include petroleum engineering, nor geology. The fact remains that petroleum engineers are as essential to the oil and gas producing industry as are chemical engineers to other war industries. Revision of existing regulations governing engineering students must be made to include the oil industry's requirements if even present skeletonized staffs are to continue to function.

Government View of Oil and Gas Industry Manpower

By Henry LeBlanc, *Acting Regional Director, Region X of the Manpower Commission*

The War Manpower Commission and those charged with administration of its policies and regulations are fully aware that finding, producing and refining of oil must rank in essentiality with food, transportation, ammunition, guns, tanks and planes. To say that any of these enumerated industries will continue to operate without their own share of hardships, so far as manpower is concerned, would be to deceive ourselves. It is well to face the fact that only one activity will continue to operate with a full and complete staff of manpower—and that is the armed forces of the nation.

It is known that a total labor force of at least 62,500,000 will be required this year. It is known that between 10,500,000 and 11,000,000 men will be in the armed forces by the end of 1943; that 2,500,000 to 3,000,000 persons will be required for agricultural work at the peak of the season. It is further known that nearly 18,000,000 women will be employed in all types of work by the end of this year.

These figures mean that every industry, every activity, will have to operate with fewer workers than under normal conditions. It is significant that every method and device known and can be evolved must be applied to get the very highest possible utilization from the labor group; industry will have to use women to replace men. Racial minority groups who heretofore have been excluded by some industries will be utilized and handicapped workers will be used in certain specialized tasks.

All of this means that training must be vastly increased and speeded up.

The oil industry, by reason of the character of the people engaged in it has been particularly subject to heavy recruitment from all branches of the armed services. Oil men by the thousands have volunteered for the army, navy and marine corps during the early days of the war; thus, as a result of commendable, but perhaps misguided sense of patriotism, the armed services have very brave and capable fighting men who probably would be rendering a more valuable service to their country making synthetic rubber or aviation gasoline.

The oil industry is confronted with the certainty of additional heavy demands upon forces of labor. For example, of all of the facilities of the United States for the manufacture of synthetic rubber from petroleum now under contract more than one-half are located in Louisiana, New Mexico and Texas. Labor force estimate for operation of these plants is about 10,000 persons, and they must come from the petroleum industry. Many of these will be skilled technicians, and there is no other source of qualified technical personnel for the new rubber industry except that of the petroleum industry.

Utilization of Existing Vocational Training Methods and Facilities For Wartime Conditions in the Oil Industry

By J. R. D. Eddy, *Director of Vocational Training, Texas Board of Education*

The manpower problem today is a very serious one. Since there is no question but what all industries and all businesses must use a larger percentage of green, unskilled, or semi-trained workers, it is necessary for each company to establish an effective training program.

As an aid in solving the personnel problems, the following points are suggested for inaugurating the training program:

1. Use should be made of the availability of highly trained foremen conference leaders by companies desiring to train carefully selected men as foremen leaders. Individual classes will be set up for companies that have 10 or more trainers at one location and for those companies who need but few trainers, institute courses will be set up at Texas A & M College.

2. The cooperation of the board for vocational education is pledged to those companies instituting a program of approved courses for upgrade employes. If new courses are needed, assistance will be given by the board in planning.

3. Under U. S. Office of Education approval, a modified program of part-time trade preparatory courses has been arranged and should be subscribed to by companies who must (1) analyze their employment needs and numbers to be trained for specific jobs, (2) make it possible that selected persons for this training be enrolled in these courses for 6 to 12 weeks before actual employment, (3) establish educational and physical standards necessary for employment so that training can be limited to qualified persons.

In general, the oil industry has used all-around workers; that is, workers that could be used in a wide variety of jobs. If the present needs for new personnel are to be met, it will be necessary to break down many of these all-round jobs to specific operations and train the new individual too for a single operation in order that he may be employed at the earliest possible moment. After employment, a training program should be developed which will assist the worker in attaining the ability to do the all-round job.

Industry's Manpower Job

By Chase E. Sutton, *Division Manager, The Pure Oil Company, Houston*

The oil industry has been slow to recognize the seriousness of its manpower situation, and consequently has lost many men because it has failed to educate its own workers and also draft boards as to the importance of oil to modern warfare. As a result the oil business today is suffering from both the lack of men and the necessity of using inexperienced men.

The government has provided two way for industries to meet the manpower situation: (1) Occupational deferment for individual cases; (2) Manpower Commission manning tables, which schedule withdrawals of men in military services.

It should be noted that nothing contemplates permanent deferment. Consequently, the oil industry must look for replacements from overage and physically unfit men and women.

To meet this situation the industry must: (1) Convince itself of the seriousness of the situation and determine to do something about it immediately; (2) The industry must correct its past mistakes. Every effort must be made to inform draft boards of the details of individual cases. It must use individual or collective training programs. It must employ more women, and it must arrange its operating and production schedules to properly utilize whatever manpower is available to it. There must be no delay in doing these things.

Oil's Manpower Program

By Dr. Frederick Harbison, *Labor Counsellor, Petroleum Administration for War*

The Petroleum Administration for War is gravely concerned over the manpower situation as it relates to the petroleum industry, foreseeing that the scheduled programs cannot be fulfilled unless something is done about the shortage of manpower—especially technical.

The industry has fallen behind in securing the answer to its manpower problem. Even though it may be at the "back of the parade," the industry, by its very aggressive nature, will find the solution

to the manpower question perhaps better than those industries further advanced. The machinery for accomplishing this is now being set up.

Several closed meetings between the regional offices of PAW, War Manpower Commission and the Selective Service Board with the leaders of the petroleum industry have been recently held. Through these meetings, a solution to the problem has been worked out that should be satisfactory. Shortly, every employer will be sent instructions as to the method of procedure in tackling the problem. Success of the program depends upon leaders of the industry.

Manpower problems are regional and should be solved regionally. Washington cannot accurately prescribe remedies that fit the local conditions; it is better solved by those acquainted with the situation. For this and the reason that the industry would rather solve its own problems with least government interference, the regional offices of PAW have been invested with great power to render decisions and to aid the local employer seeking help.

Saving Manpower Theme Of Safety Conference

With the general theme of saving manpower for warpower running through all its sessions, the Texas Safety Conference of the Texas Safety Association held its fifth annual meeting in Houston last week.

R. B. Roaper

New officers elected for the coming year included R. B. Roaper, director of safety for Humble Oil & Refining Company, Houston, president; A. F. Allen, president of Texas Employers Insurance Company, Dallas, vice president; E. E. McAdams, executive secretary of the Texas League of Municipalities, Austin, vice president; Homer Garrison, director of the Texas Safety Department, Austin, vice president; Oscar B. Tyler, president of Gulf States Telephone Company, Tyler, Texas, vice president; Raymond Mauk, secretary American General Insurance Company, Houston, secretary.

In his discussion of cause classification of accidents, before the industrial safety section of the meeting, Roaper outlined basic and direct causes. He gave five factors in any accident sequence: inheritance and social environment; faults of persons; unsafe acts; physical or mechanical conditions; accidents; injuries. He showed that through inheritance or environment, workers are endowed with faults which lead to unsafe acts resulting in accidents and injuries. Direct responsibility for prevention of accidents rests on the management of any corporation. Safety engineers are charged with the obligation of creating sufficient enthusiasm on the part of their supervisors to put over the safety programs. This is made easier since safety is now accepted as an operating principle in industry and is now considered an integral part of any well organized corporation.

Attitude and Activity of Independents To Be Outlined at St. Louis Meet

Addresses by outstanding governmental officials and oil men and a program of discussion that will outline the attitude and activity of independent producers of oil will occupy the two days of the mid-year meeting of the Independent Petroleum Association of America at St. Louis, Mo., May 7 and 8. Sessions will be held in the New Jefferson Hotel.

From 250 to 300 independent producers, representing all oil-producing areas from California to New York and Pennsylvania, are expected to be present. This will be the first of either the mid-year or the annual meetings of this national association to be held in other than a major oil-producing state. Membership is distributed in all oil-producing states, 23 in number, and in 20 others.

Growing interest in production of petroleum has resulted in recent weeks because of concern expressed by governmental agencies that the supply of oil may fall below demand at a time not far distant. Two committees of the national House of Representatives have held hearings and one has reported to the House that immediate measures should be taken to stimulate efforts to find new fields and to maintain present ones at efficient levels.

One petroleum supply investigation was held by the Committee on Small Business of the House, of which Representative Wright Patman, Texas, is chairman. One of the members is Representative Walter C. Ploeser, of Missouri, whose home is in St. Louis. He will address the independent oil producers at the Friday luncheon, May 7.

The chairman of the other committee, Representative Clarence F. Lea, of California, will address the IPAA members on May 8 at the luncheon. Mr. Lea's committee, a long established one dealing solely with petroleum, consists of seven members. Its hearings were held in April.

Senator Edward H. Moore, of Oklahoma, himself an independent oil producer of many years experience, whose business interests now are chiefly confined to cattle raising, will speak at the dinner the final evening, Saturday, May 8 Senator Moore began his first term in the United States Senate in January.

Pre-meeting sessions of standing committees will occupy Thursday, May 6. There are 11 such committees, each dealing with a special phase of the producing industry. On that day the Committee on Crude Oil Requirements will meet. This group consists of representatives of some 35 national, regional and state associations of oil producers and was organized late in 1942 to effect the broadest possible representation on problems common to the producing industry of the United States.

In addition to the speakers previously mentioned, the following will be heard in Friday sessions: Frank Buttram, Oklahoma City, president of the Independent Petroleum Association of America, on "The Independent Is at the Cross Roads"; Ralph T. Zook, Bradford, Penna., who recently completed the Third Army Orientation Course at Fort Leavenworth, Kans., on "War and the Oil Industry"; Paul Ryan, Cleveland, O., chairman of the post-war planning committee of the Petroleum Industry War Council, on "Post-War Planning for Independents"; N. T. Gilbert, general manager of Midstates Oil Corp., Tulsa, and treasurer of the association; Donald R. Knowlton, Washington D. C., director of production, Petroleum Administration for War, on "What Materials Will Be Available for 1943 Drilling Requirements"; N. C. McGowen, Shreveport, La., president of Union Producing Co., on "Where Will the Petroleum Industry Obtain Its Manpower?"; Judge William N. Bonner, Houston, on "Some Labor Problems of the Petroleum Industry."

Saturday meetings will also cover a wide range of discussion on questions important to oil producers. Russell B. Brown, Washington, D. C., general counsel of the IPAA, will speak on "The Petroleum Industry in Washington." H. B. Fell, executive vice-president of the IPAA will give the report of the Committee on Crude Oil Requirements, of which he is chairman. Walter S. Hallanan, Charleston, W. Va., president of Plymouth Oil Co., will speak on "The Price Incentive in the Production of Petroleum"; William R. Boyd, Jr., chairman of the Petroleum Industry War Council, on "The Industry Needs the Independents."

On Saturday afternoon there will be further discussion of the price incentive as to three phases of the producing industry: A. C. Simmons, Bradford, Pa., will tell of the effect on secondary recovery of oil; A. S. Ritchie, Wichita, Kans., will speak on price and its relation to wildcatting and Charles P. McGaha, Wichita Falls, Tex., president of the National Stripper Well Association, will discuss price and the operation of the small, or stripper, wells.

The final action of the association previous to the dinner which will close the meeting, will be the report of the resolutions committee and the discussion that will result in the official declarations of the IPAA. Walter L. Goldston, of Houston. is chairman of this committee and will present the report.

Electric Association Announces Annual Program

Papers dealing with electric power's participation in the war program will be presented at the 16th annual convention of the Petroleum Industry Electrical Association and Petroleum Electric Supply Association, May 5, 6, at Houston. Officers of the P.I.E.A. are L. G. Wainman, president, El Paso; F. W. Littell, vice president, Houston; and J. F. Collerain, secretary, Houston. Officers and directors of the P.E.S.A. are E. T. Gunther, president; E. C. Dwelle, vice president; C. A. Heiser, secretary-treasurer; George T. Brundrett, L. A. Haley, H. E. Kirby, and C. C. Bledsoe.

First technical sessions is scheduled May 5 when G. M. Kintz of the Bureau

The Carter Oil Company Is 50 Years Old

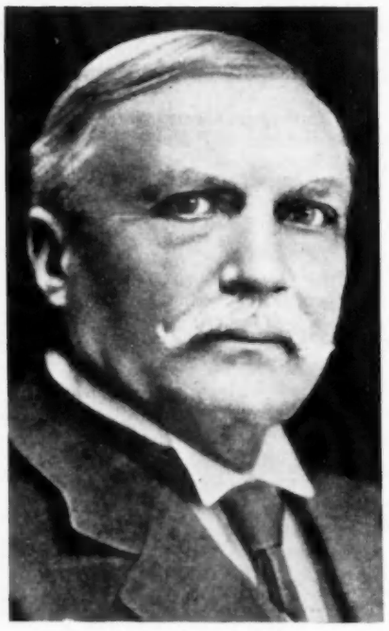
ON MAY 1, The Carter Oil Company, Tulsa, completed 50 years of service to industry. Founded in 1893, by Colonel John J. Carter, at Sistersville, West Virginia, the company has operated as a producer of crude petroleum continuously since that date. Colonel Carter, at the time he started the company, had in mind the immediate development and operation of properties obtained in the Sistersville area, and from this unimpressive beginning, the company has expanded progressively through a half-century until now it ranks among the larger organizations of its kind in the country. As the petroleum industry has grown from a minor industrial position to a national and indispensable asset, so has The Carter Oil Company grown to national importance, ranking high in its contribution to the present struggle being waged for the preservation of freedom.

Colonel Carter, the founder, was born in Westport, County Mayo, Ireland, in 1842. At the age of four he came to America and was educated at Nunda Literary Institute, Nunda, New York. At the outbreak of the War in 1861, he enlisted in the Union Army as a private. Four years later when discharged, he held the rank of Lieutenant Colonel, also a citation with the Congressional Medal of Honor for "most distinguished gallantry in action" at the Battle of Antietam.

Upon his return to civilian life he went into the mercantile business in Titusville, Pennsylvania, in 1865. Two years later he was engaged as an oil operator in the Bradford field, and in 1893, he organized The Carter Oil Company and served as its president from that time until 1915, two years prior to his death.

Toward the end of 1893, controlling interest in The Carter Oil Company was acquired by South Penn Oil Company, a subsidiary of which company was later to be known as Standard Oil Company of New Jersey.

With the rapidly expanding oil industry in Pennsylvania and West Virginia, Carter soon became the most prominent operator in the Sistersville field and started an expansion program which included operations in other fields of West Virginia and Eastern Ohio, already heading toward the Mid-Continent where Tulsa, headquarters were opened in 1913. In 1915 the company acquired its first Oklahoma production, from the Yarhola and Manuel leases in the Cushing-Drumright field. Shortly thereafter properties were secured in the Eldorado, Kansas, field, and since then The Carter Oil Company has been an important participant in Mid-Continent oil development, both as a producer and purchaser of crude, being among leading developers of such fields as Burbank, Seminole, Oklahoma City, Fitts, Kraft, Trapp, Billy Creek, Salt Creek, Loudon, Addix, Prairie Creek, Mount Vernon, and many others.



COL. JOHN J. CARTER
Founder, The Carter Oil Company

Since entering the Mid-Continent, The Carter Oil Company has made an intensive effort to augment production by new discoveries, and today the company is among leading explorers for oil. Its exploratory parties are a familiar sight along highways and county roads of states in which it operates, as the company concentrates on finding petroleum so vitally needed for the war effort.

An early advocate of conservation, and an exponent of progressive production practices, it is the company's established policy to make an exhaustive study of oil reservoirs wherever it operates and to pursue practices consistent with conservation and efficiency.

In 1935, the company interested itself in unitized development of the South Burbank pool, one of the early projects of this type. Another example of such development is the Loudon field in Illinois. By maintaining pressure through reinjecting the gas into the producing horizon, efficient production rates have been maintained in the field.

Through purchase of control in Santa Rita Oil & Gas Company and Northwest Refining Company, Carter acquired its first production in the Northwestern part of the country, and also became active in refining and marketing.

Carter's modern research laboratory is now devoted to war research.

The company's present activities extend throughout 21 states, with production operations in Kansas, Oklahoma, Arkansas, Louisiana, Mississippi, Illinois, Indiana and Kentucky, with exploration over a much wider area.

of Mines will give a demonstration of control of static electricity. Other papers to be presented that day are: "The Petroleum Industry's Civil Air Raid Warning System," Capt. James L. Whitcomb, 3rd Fighter Command; "Wartime Maintenance and Operation of Electrical Equipment," W. E. Silvus, engineer, General Electric Company; "Experience with Zinc Anodes," William E. Huddleston, Cities Service Gas Company; "Problems in Connection with the Cathodic Protection of Bare Pipe," W. H. Stewart, Sun Pipe Line Company; "Intercompany Procedure," G. R. Olsen, United Gas Pipe Line Company; "Null Circuit for Determination of Current Requirements for Cathodic Protection Systems," K. H. Logan, United States Bureau of Standards. Steve Day of The Barrett Company will present a technicolor and sound movie on the big-inch pipe line at 7 p.m. May 5.

Papers and addresses scheduled for May 6 are: "Electrical Power for War," Frank M. Austin, vice president of Houston Lighting & Power Company; "War Production," Joseph H. Liston, WPB division of information, Washington; "Galvanic Couples," M. C. Miller of Ebasco Services, Inc.; "Prepared Discussion of Miller's Paper," W. F. Rogers, Gulf Oil Corporation; "The Practical Design and Economics of Cathodic Units as Applied in the Refinery," Derk Holsteyn, Shell Oil Company; "Control of Stray Currents from Cathodic Protection Installations," G. R. Olsen and C. H. McRaven, United Gas Pipe Line Company; "Current Density Related to Current Distribution," H. C. Gear, Lone Star Gas Company.

The afternoon program includes papers on "The Supply Group Relation to Cathodic Protection—Questions and Answers," H. C. Gear; "Things to Come," M. C. Miller; "The Electronic Holiday Detector," D. E. Stearns, United Gas Pipe Line; "Modern Pyramids," H. H. Frasch and M. J. Dorcus, National Carbon Company.

AIME Petroleum Section Announces Dallas Program

The Petroleum Division of AIME in cooperation with the East Texas Section of AIME will hold its spring meeting at the Adolphus Hotel, in Dallas, Texas, May 6-8. The program follows:

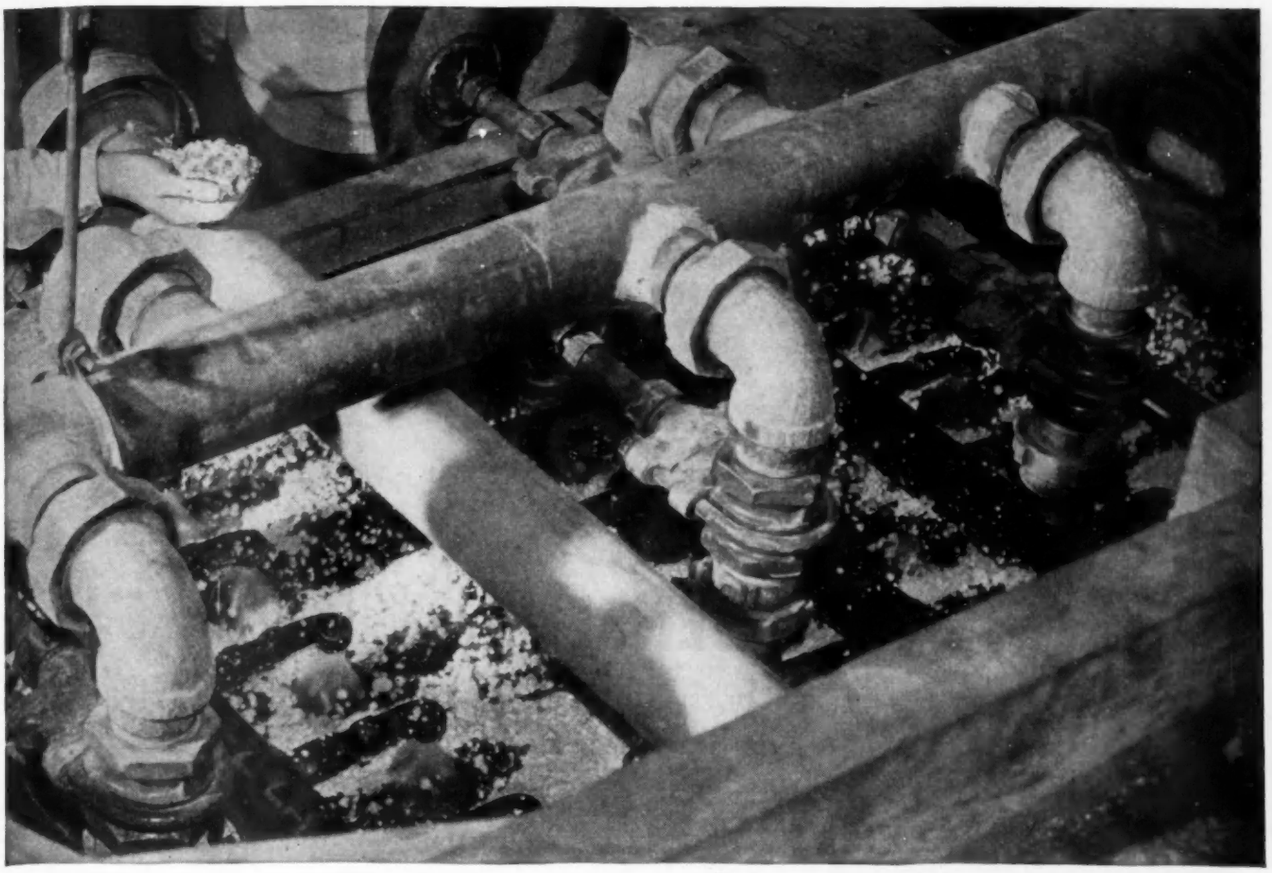
Thursday, May 6

9:00 a.m.—Adolphus Hotel
Registration of all members and guests. Registration fee is $2. Papers will be issued at time of registration.

Technical Session

10:00 a.m.—Grand Ballroom, Adolphus Hotel.
R. G. Hamilton, *Chairman*
W. S. Morris, *Co-chairman*

1. *The Effect of Certain Bacteria on Flow of Water through Porous Media,* by F. B. Plummer, H. J. Sawin and Ernest Merkt, University of Texas.
2. *Elasticity of Reservoir Rocks and Fluids with Special Reference to the East Texas Field,* by David Donoghue, Fort Worth, Texas.
3. *Factors Affecting the Deterioration of*



OUT OF THESE FLOCS MAY COME THE FUTURE OF THE WORLD

These white crumbs or "flocs" look very unimportant in themselves . . . but on them may depend the future of the world. They are one of the first stages in the production of synthetic rubber, the most vital material being produced in America today.

Naturally, you are interested in synthetic rubber. But synthetic rubber is only incidental. What is really important is what happens to synthetic rubber after it is actually produced. It is chemistry that makes rubber fit to use, suits it to the task at hand.

United States Rubber Company is the largest manufacturer of rubber chemicals in the world. We have worked with rubber, improved it and broadened its uses for 100 years. Today, all this tremendous fund of knowledge of the chemistry of rubber is being drawn upon to improve synthetic rubber, perfect it for the jobs it must do for the Armed Forces and war industry.

The chemistry of rubber is what determines the final compounding and processing of the flocs of synthetic rubber you see here. They may eventually go into bullet-sealing hose, air ducts, or any one of a score of other parts used in the plane that will blast the last Nip carrier off the sea. They may be made into a tire that will rumble down bomb-battered Unter den Linden. They may go into some essential equipment like a conveyor belt that will keep America's war production line moving at top speed. They might very easily determine the entire course of the war, and thereby the future of the world.

Synthetic rubber, its production, compounding and application to war and industrial uses, is too big a story to present adequately here. There are five basic commercial types of synthetic rubber. Each of them has distinct properties and characteristics. Not a single one is ideal for all purposes.

Deciding which synthetic rubber to select and use for a particular task is an equally big story, a decision that requires expert knowledge and broad range experience.

We have told the story of the five basic commercial types of synthetic rubber, our more than twenty years of experience in working with them, and our twelve years of using synthetic rubber commercially in an interesting, informative booklet for business executives. Please ask for your copy on your regular business letterhead.

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In Canada: Dominion Rubber Co., Ltd.

Hydrocarbons in Storage, by H. H. Power, F. H. Allen and H. J. Sawin, University of Texas.

Technical Session

1:30 p.m.—Grand Ballroom, Adolphus Hotel.

John R. Suman, *Chairman*
C. E. Reistle, Jr., *Co-chairman*

4. *A Challenge to the Petroleum Engineer,* by D. R. Knowlton, Director of Production, Petroleum Administration for War.
5. *Salt Water Disposal at East Texas,* by W. S. Morris, East Texas Salt Water Disposal Co.
6. *Review of Exploration and Exploitation Practices,* by A. R. Denison, Amerada Petroleum Corporation.

Friday, May 7

9:30 a.m.—Grand Ballroom, Adolphus Hotel.

J. M. Bugbee, *Chairman*
M. Albertson, *Co-chairman*

7. *Productive Capacity of Flow Pipes in Gas-Lift Operations,* by S. F. Shaw, Agricultural and Mechanical College of Texas.
8. *Further Developments in Caliper Logging,* by C. P. Parsons, Halliburton Oil Well Cementing Co.
9. *Optimum Pumping Conditions,* by D. O. Johnson, The S. M. Jones Company.
10. *Pressure Behavior in Flowing Oil Wells,* by L. V. Uhrig, Humble Oil & Refining Co.

12:30 p.m.—Adolphus Hotel
Executive Committee, Petroleum Division, Luncheon Meeting.

Technical Session

1:30 p.m.—Grand Ballroom, Adolphus Hotel.

R. W. Erwin, *Chairman*
A. G. Loomis, *Co-chairman*

11. *Analysis of Oil Production in Near-Depleted Mexia-Powell Fault-line Fields of Texas,* by H. B. Hill and R. K. Guthrie, U. S. Bureau of Mines.
12. *The Surface Tension of Crude Oils Containing Dissolved Gases,* by D. L. Katz, R. R. Monroe and R. P. Trainer, University of Michigan.
13. *The Selective Adsorption of Hydrocarbon and Water Vapor on Alumina at Atmospheric Pressure,* by C. C. Ku, R. L. Huntington and L. S. Reid, University of Oklahoma.
14. *The Study of Reservoir Fluids by Surface Recombination Experiments,* by H. G. Botset and M. Muskat, Gulf Research and Development Co.

7:00 p.m.—Adolphus Hotel.

Informal Dinner

Charles A. Warner, *Chairman,* Petroleum Division, presiding. After-dinner talk, speaker to be announced.

Saturday, May 8

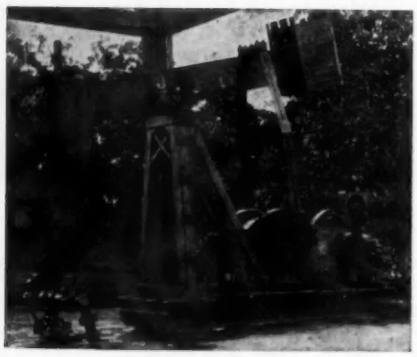
9:30 a.m.—Grand Ballroom, Adolphus Hotel.

L. W. Blau, *Chairman*
Paul Weaver, *Co-chairman*

Introductor remarks on new Geophysics Committee of the Petroleum Division.

15. *Electrical Well Logging,* by W. M. Rust, Jr., Humble Oil & Refining Co.
16. *The Choice of Sedimentary Hydrocarbon Data,* by E. E. Rosaire, Geophysics and Geochemistry.

They Have Lots of Friends . . . These JENSENS



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Oklahoma May Allowable Fixed at 379,000 Barrels

The Oklahoma Corporation Commission April 28 fixed the state allowable for May at 379,000 barrels, this total including 30,000 barrels of distillates and light ends.

In a hearing on the West Cement area where an analysis of pressure conditions in the Medrano sand is under way, the commission heard PAW suggest a 10-day to 2-week shutdown for the producing area in this formation pending further investigation. The question under consideration is on the possibility of overproduction of gas and the possibility of loss of reservoir pressure by producing methods not in line with modern conservation practices. The commission has the suggestion under advisement.

Louisiana May Allowable Gives South End Increase

Louisiana's daily oil allowable for May has been fixed at 356,170 barrels by the state conservation department. This is a decrease of 2048 barrels from April.

With the allowable reduced, South Louisiana has been increased from 270,604 barrels daily in April to 271,695 barrels in May, an increase of 1091 barrels.

Kansas Allowable Slightly Under May Quota

The Kansas Corporation Commission on April 27 recommended an allowable of 300,000 barrels daily for the state in May. This figure includes 5000 barrels of distillate and light-end products. PAW had recommended 309,700 barrels.

Formal approval is anticipated in an early announcement by the commission.

Inventories of Fuel Oils Increased as Refinery Runs Reach New High for Year

Having increased refinery runs of crude to a new high level for this year, the industry during the week ended April 24 achieved a substantial addition of needed residual fuel oils to storage, accumulated considerable light fuel oil, and increased production of gasoline to an extent that permitted the withdrawal of only a normal amount of gasoline for this season.

Meanwhile, the shortage in the East Coast district at least did not become any worse, whereas it previously had been becoming more serious each week. The American Petroleum Institute index of civilian supplies of gasoline, light, and heavy fuel oils on the Eastern Seaboard was unchanged from the previous week at 28.1 percent of normal, compared with 60.1 on September 12, 1942.

Refiners of the United States charged to stills 3,737,000 barrels of crude daily —the heaviest runs for any week this year and 65,000 barrels per day more than in the previous week. The runs were 6.7 percent above the average of 3,500,000 daily in the week ended April 25 last year. The plants of the country were operating at approximately 78 percent of their rated capacity. Those in the East Coast and Southwestern districts combined made use of 68 percent of their capacity and those of the interior of the country east of the Rockies operated at 85 to 90 percent of capacity. Rocky Mountain plants used 67 percent of capacity and those of California 92 percent (753,000 barrels of crude daily).

The addition of 448,000 barrels of residual fuel oil to storage in the United States in the week ended April 24 was made possible by stepping up production of that product 216,000 barrels over the previous week's output. The week's production of 8,168,000 barrels was 1,299,000 barrels or 19 percent in excess of the 6,869,000 barrels of production in the week ended April 25, 1942. Having moved up to 67,455,000 barrels, the residual fuel inventories were nevertheless 13,000,000 barrels (16 percent) under the level at which they stood a year earlier. All districts added to storage in the week of April 24 except the Appalachian, which took out only a very small amount. California added 187,000 barrels, with production 127,000 less than in the previous week.

Stocks of gas oil and distillate fuel were increased 216,000 barrels in the whole country, although production was only 43,000 barrels greater than in the previous week. By continuing additions to storage, the industry is somewhat improving the inventory situation of this product, which will be urgently needed again next fall and winter. Stocks totaled 31,142,000 barrels on April 24 and were nearly 3,000,000 barrels (9.6 percent) greater than on the corresponding date last year. The production rate for the week was 21 percent higher than that in the like week last year, output having totaled 3,954,000 barrels, or 687,000 more than the 3,267,000 produced in the like week last year. The interior districts east of the Rockies took the light fuel oils from storage, but California and Rocky Mountain states added to stocks, with benefit of increased production; while the East Coast and Southwestern districts also accumulated

Crude Oil Production in the United States

(Estimates compiled by The Oil Weekly. All figures indicate daily averages, in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED April 24	May 1
Arkansas	71,600	72,250
California	781,500	777,100
Long Beach	32,900	32,150
Midway-Sunset	55,600	54,800
Kettleman Hills	43,850	42,900
Wilmington	94,200	93,750
Rest of State	554,950	553,500
Colorado	6,450	6,600
Illinois	225,350	229,550
Salem	30,200	31,100
Louden	41,800	40,000
Other New Pools	141,950	146,650
Old Pools	11,400	11,800
Indiana	14,300	12,400
Kansas	318,800	316,250
Kentucky	13,250	12,200
Louisiana	346,400	346,600
North	88,300	88,350
South	258,100	258,250
Michigan	59,350	57,250
Mississippi	53,150	55,350
Missouri	95	90
Montana	21,000	20,900
Nebraska	2,250	2,150
New Mexico	97,350	97,500
New York	13,900	14,150
Ohio	11,750	8,550
Oklahoma	341,450	342,350
Oklahoma City	59,700	57,750
Seminole Area	77,250	77,750
Rest of State	204,500	206,850
Pennsylvania	44,650	44,900
Tennessee	30	35
Texas	1,391,400	1,391,800
Upper Gulf Coast	340,800	340,850
East Texas Field	320,200	320,350
Rest of Eastern Texas	99,950	99,850
Lower Gulf Coast	117,300	117,400
Southwest Texas	54,650	54,700
South Central Texas	17,800	17,750
West Texas	214,550	214,650
North Texas	135,000	135,150
Panhandle	91,150	91,100
Utah	10	10
West Virginia	9,300	8,100
Wyoming	96,200	97,600
Total United States	3,919,535	3,913,685

Trends of Operations and Changes in Stocks

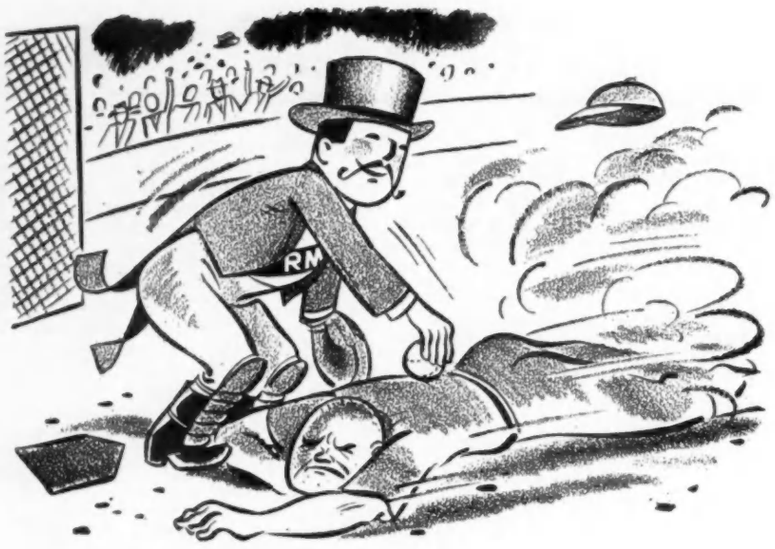
Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

(All figures in thousands of barrels—add 000)

ITEM	Crude Oil Prod. Barrels Daily	Crude Oil Prod. Week Ended	Runs to Stills Barrels Daily	Runs to Stills Week Ended	Crude Stocks Barrels	Crude Stocks Week Ended	Gasoline Stocks Barrels	Gasoline Stocks Week Ended	Gas Oil & Distillate Stocks Barrels	Gas Oil & Distillate Stocks Week Ended	Residual Fuel Oil Stocks Barrels	Residual Fuel Oil Stocks Week Ended
Highs:												
1939	3,910	8– 5	3,650	10–21	278,607	5–26	87,769	4–22	39,562	10–28	116,237	8–26
1940	3,890	3–16	3,690	6–22	265,865	8–31	102,817	4–20	49,051	10–19	109,135	9–14
1941	4,337	11–22	[4]4,120	10–18	266,187	3–29	99,727	3–29	[5]54,983	11–15	102,448	1– 4
1942	[4]4,337	2– 7	3,961	1– 3	263,208	3–28	[1]109,281	3–14	49,861	11–14	95,857	1– 3
1943	3,949	4–10	3,737	4–24	241,421	4–17	94,159	3–20	42,913	1– 2	72,881	1– 2
Lows:												
1939	[3]1,601	8–26	3,125	2–18	[2]229,127	10–12	71,152	10– 7	20,722	4–15	105,397	4– 8
1940	3,335	11–30	3,370	1– 6	237,339	1–27	79,847	11– 9	23,551	4– 6	102,344	2–10
1941	3,364	1–11	3,490	1–18	240,399	11–15	79,923	10– 4	28,381	4–12	90,914	7–12
1942	3,297	7– 4	3,393	5–23	231,896	12–12	75,934	12– 5	29,240	4–25	72,962	12–26
1943	3,821	1– 9	3,579	3–13	232,191	1– 9	82,420	1– 2	30,732	4– 3	67,007	4–17

Trends in Week Ended:	Crude Oil Production Daily	Crude Oil Runs to Stills Daily	Crude Oil Stocks Week End	Gasoline Production Weekly	Gasoline Stocks Week End	Gas Oil and Distillate Production Weekly	Gas Oil and Distillate Stocks Week End	Residual Fuel Production Weekly	Residual Fuel Stocks Week End
1942:									
January 3	4,038	3,961	244,440	13,797	92,987	3,855	49,357	6,918	95,857
January 31	3,871	3,848	250,740	13,292	97,810	3,817	40,674	6,640	91,189
February 28	4,016	3,675	259,373	12,131	105,635	3,799	34,547	6,813	88,285
March 28	3,820	3,667	263,208	11,663	105,624	3,661	31,756	6,344	83,045
April 25	3,581	3,506	257,073	10,535	102,897	.....	29,240	.....	81,107
May 30	3,877	3,522	255,023	10,478	95,355	.....	31,384	.....	79,628
June 27	3,719	3,581	253,364	10,713	88,396	.....	32,851	.....	77,304
July 25	3,691	3,658	249,262	10,864	82,281	.....	35,966	.....	77,816
August 29	3,964	3,697	249,007	11,300	80,831	.....	42,060	.....	78,034
September 26	3,909	3,802	242,785	10,954	80,550	.....	45,945	.....	78,943
October 31	3,901	3,731	239,266	11,153	79,159	.....	48,131	.....	79,166
November 28	3,878	3,736	234,850	11,269	78,854	.....	49,739	.....	77,796
1943:									
January 2	3,871	3,734	233,938	10,957	82,420	4,285	42,913	7,683	72,881
January 30	3,826	3,698	233,863	10,339	88,830	3,888	37,057	7,452	70,763
February 27	3,873	3,709	235,217	10,566	93,157	4,230	32,939	7,839	70,140
March 27	3,896	3,742	239,126	10,231	94,079	3,541	30,980	8,018	67,938
April 3	3,918	3,624	239,864	10,361	93,409	3,903	30,732	8,209	67,483
April 10	3,949	3,677	239,925	10,182	93,212	3,823	30,906	7,681	67,185
April 17	3,907	3,672	241,421	10,370	92,121	3,911	30,926	7,937	67,007
April 24, 1943	**3,913**	**3,737**	.....	**10,583**	**91,114**	**3,954**	**31,142**	**8,168**	**67,455**
April 25, 1942	3,581	3,500	[4]257,563	10,542	103,359	3,267	28,407	6,869	80,374
Change:									
In week	+6	+65	+1,496	+213	—1,007	+43	+216	+231	+448
In year	+332	+237	—16,142	+41	—12,245	+687	+2,735	+1,299	—12,919
In year	+9.2%	+6.7%	—6.2%	+0.3%	—11.8%	+21.0%	+9.6%	+18.9%	—16.0%

[1] All time peak. [2] Lowest since April, 1922. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent States. [4] Stocks, April 18, 1942.



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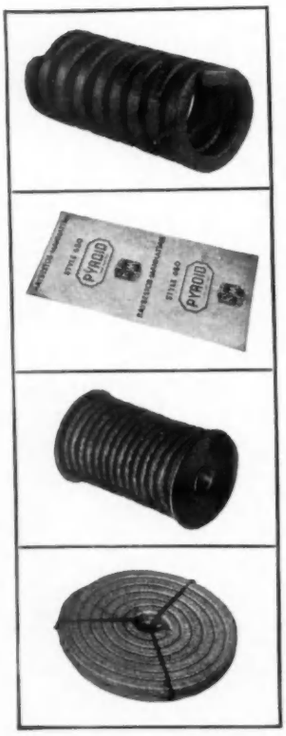

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storage, even though production was down.

Stocks of finished and unfinished gasoline in the United States were lowered 1,007,000 barrels in the week of April 24, to 91,114,000 barrels. That figure was 12,245,000 barrels (12 percent) above the 103,359,000 reported for April 25 last year. The withdrawal occurred in spite of the production of 213,000 barrels more than in the previous week, output having totaled 10,583,000 barrels. The latter figure was 41,000 barrels in excess of the 10,542,000 barrels of production in the week ended April 25, 1942. All districts took gasoline from storage except California, the Rocky Mountains, and the Appalachian region. Production was higher than in the previous week in all districts except California and the Middle West.

Production of crude oil averaged 3,913,000 barrels per day in the week of April 24, up 6,000 from the previous week, and 332,000 barrels (9.2 percent) above the daily average of 3,581,000 in the week ended April 25 last year.

Stocks of crude oil have continued to accumulate. They rose 1,496,000 barrels in the week ended April 17, the Bureau of Mines reported, to a total of 241,421,000 barrels, highest point of this year. The crude stocks are, however, 16,000,000 barrels (6 percent) less voluminous than at this time last year.

Gasoline Short in East And Scarce in Interior

Markets of the industry currently are featured by scarcity of most products, pleas for relief from the gasoline shortage in the East, and continued agitation for higher crude-oil prices.

On the East Coast all products are very scarce, and while some suppliers have meager stocks of gasoline, many others are completely sold out, without having any assurance of replenishments. While there is no general relief scheduled, PAW is making exceptions to PAO No. 5, which bans tank-car shipments of gasoline to the East Coast, to afford relief at points of critical need. Tank cars last week were moving eastward to take care of such situations, and expected deliveries as high as 100,000 barrels daily were counted upon to end the crisis. Meanwhile, there were "no gas" signs at many service stations, and the shortage was particularly severe in New England. Milder weather has virtually eliminated the demand for burning oils, and there has not been much serious thought of attempting to build up storage, in the realization that possibilities of this nature depend largely on trends of military requirements.

Gulf Coast markets continue relatively quiet, although there has been continued movement of fuel oils in substantial volume. Principal business is in filling government orders, while inquiries mostly involve high-octane gasoline and special fuels. Refiners still complain of the difficulty of arranging for transportation.

Western Pennsylvania refiners report continued firm demand for most products and difficulty in supplying it, with inventories low. Light fuel oils and certain grades of gasoline were quoted higher last week by some refiners who previously had not met advances by competitors.

Middle Western refiners and marketers reported only slight easing of demand for fuel oils and further increase

of demand for gasoline. The call for light fuel oil apparently was due partly to stocking for next winter's use, and it was predicted that accumulations in storage would continue through the summer if conditions permit. The strength in gasolines was characterized by remarkably strong demand for low-octane and third-grade, which were more scarce than the superior grades. Supplies of kerosine and range oil also were short.

Refiners of the upper Mid-Continent have continued to encounter heavy demand for all products. Burning oils still are scarce, and kerosine is exceptionally short in Oklahoma. Agricultural demand for gasoline is higher than last year and it is expected to continue well above the 1942 trend. The strong demand already has caused some buying of material by refiners from other refiners. And there are predictions that serious shortages of gasoline will develop unless yields are adjusted. The demand for tractor fuel in the Mid-Continent shows an even greater increase over last year than does that for gasoline.

Among the developments in the crude-oil market situation last week was the introduction in the Senate of a resolution calling for Congressional authorization of a price increase, although no early action on the proposal was planned. Another was the prediction that a 12-cent advance in Tinsley, Mississippi, crude might be approved by OPA.

Big-Inch May Draw on West Texas Sour Crude

Inclusion of Permian Basin sour crude in the grades of oil to be handled by the big-inch pipe line is in prospect now that the system has been called upon to alter its May schedule. The operating committee has under consideration the diversion of 110,000 barrels of Southeastern New Mexico and West Texas oil daily during May from existing pipeline and rail movements and from stocks in the Gulf Coast to the 24-inch carrier.

The June schedule for sour oil has been tentatively set at 76,000 barrels daily that will involve a 21,000-barrel hike in Permian Basin allowable due to liquidation of stocks that contributed to the May shipments.

Four or more of the reversed crude lines connecting the Houston-Beaumont district with the Longview terminal of the big-inch carrier will participate in relaying the sour crude. Some of these feeder lines will discontinue handling sour oil when stocks near their Gulf Coast terminals are disposed of.

Atlantic Pipe Line Company is currently moving 16,500 barrels of New Mexico and West Texas crudes through Longview to Jefferson, Texas, where the oil is loaded into tank cars for delivery to The Atlantic Refining Company's Philadelphia refinery. The company has facilities to handle 40,000 barrels of Permian Basin oil daily to Longview. Until recently Atlantic Pipe Line Company transported its Permian Basin oil to Atreco, thence via an 8-inch to Neale field, Beauregard Parish, La., for tank car loadings, along with South Louisiana rail shipments to the East Coast. Atlantic diverted its East Texas field crude runs to the big-inch and reversed the stream on its Longview-Atreco 10-inch to function as a sweet crude feeder for the government-owned carrier. The company has temporarily shortened the rail haul on Permian Basin oil while awaiting assignment of crude shipments for the big-inch through the use of its Jefferson rack, which is reached by routing crude from Longview via the reversed United Oil Pipe Line Company's 8-inch, which formerly delivered Rodessa oil into the East Texas field.

More Sweet Oil From Coast

Supplemental supply of sweet crude for the Longview-Norris City line has been provided through purchase of 1,000,000 barrels of Texas Coastal "B" oil from 9 scattered fields. The bulk of this crude will be supplied by Gulf Refining Company from its daily runs. The common stream will average 33 gravity.

The Gulf Coast fields that will supply the spot crude order are: Anahuac, East Orange, Hankamer, Hull, Pierce Junction, Rabbs Ridge, Stowell, Thompson (light) and Winnie. Crude gatherings will be delivered to Sun Pipe Line Company's terminal and station at Beaumont, then routed through the latter's reversed 10-inch line to Longview. Sun Pipe Line Company's carrier was scheduled to have started pumping heating oil from Beaumont on April 15 to Longview, but the demand for crude forced change of plans.

All stocks of crude in the East Texas field available for the big-inch system were liquidated before deliveries to Norris City were curbed. Privately owned lines that serve as feeders to the system have been called upon to empty partially filled tanks as a means of forestalling a shortage of sweet crude.

Crude Demand 3,919,400 Barrels Daily During May, Bureau of Mines Estimates

A forecast that motor-fuel demand in May will run to 49,400,000 barrels, a 10-percent decrease from actual demand in May, 1942, was issued by the Bureau of Mines April 26 in its monthly forecast placing May requirements for domestic crude at 3,919,400 barrels daily, 19,400 barrels above the estimate for April and 264,200 barrels higher than the actual a year ago.

The bureau's forecast, however, was seen as short of the mark in gasoline demand in view of an OPA order of the same day lifting the ceiling on automobile mileage in all sections except the Eastern shortage area.

The latest available figures on operations showed that daily average crude production during the four weeks ended April 3 was 3,899,000 barrels and total runs to stills 3,641,000 barrels, with an increase in crude stocks of 149,000 barrels daily, indicating a demand for domestic crude of 3,750,000 barrels a day.

"The Bureau of Mines figures for January and February, combined with current figures for March, indicate a total demand for motor fuel of about 124,000,000 barrels in the first quarter of 1943, a decline of over 17 percent compared with the same period in 1942," the report commented. "On the same basis, the demand for distillate fuel oil decreased by about 9 percent and the demand for residual fuel oil was almost 3 percent below last year. These three products represent about 80 percent of the estimated total demand for all oils, which apparently was about 9 percent under last year. While total demand was substantially below last year, the demand for domestic crude petroleum showed a fractional gain, stocks of all oils remained at an almost stationary level compared to a decline of about 10,000,000 barrels in the first quarter of 1942, crude runs showed a decline of about 3 percent, and imports were relatively low. As transportation facilities improve, the replenishment of stocks in the East Coast should require a substantial increase in crude demand and runs to stills if an excessive level of operations is to be avoided later in the year."

Stocks of finished and unfinished gasoline amounted to 92,848,000 barrels at the close of February, and American Petroleum Institute figures indicate an increase of approximately 600,000 barrels during March which the bureau estimates will be withdrawn during May.

Direct sales of natural gasoline were estimated as 1,600,000 barrels, making an indicated refinery production of 47,200,000 barrels, which the bureau allocated as follows: East Coast, Inland Texas, Texas Gulf Coast, Louisiana Gulf Coast and Inland Louisiana-Arkansas, 20,630,000 barrels; Appalachian, 2,010,000 barrels; Indiana, Illinois, Kentucky, etc., 10,840,000 barrels; Oklahoma, 2,210,000 barrels; Kansas, 2,721,000 barrels; Rocky Mountain, 1,490,000 barrels; California, 7,300,000 barrels.

Natural gasoline to be blended at refineries was estimated at 4,650,000 barrels, and application of the estimated yield of 37 percent to the straight-run and cracked gasoline production of 42,550,000 barrels gives total crude runs of 115,000,000 barrels, or 3,709,700 barrels daily.

Crude for export and to be used as fuel, and losses, was placed at 6,700,000 barrels, making the total demand for domestic crude 121,500,000 barrels, or 3,919,400 barrels a day.

The bureau also issued its monthly statement, showing that crude production in February averaged 3,871,400 barrels, compared with 3,781,500 barrels in January and 4,070,000 barrels in February, 1942.

Most of the states reported higher production in February, with a slight gain even in Illinois, but the only record broken was in Kansas, where output run to 310,400 barrels, compared with 238,800 barrels in February, 1942. All the major districts of Texas made gains, but the daily average of 1,357,900 barrels for the state was about 192,000 barrels below last year.

The bureau found the rate of oil-well completions about the same as in February, but noted an improvement in the number of dry holes drilled and in total initial. The number drilling at the close

of the month was 2,227, or 146 less than in 1942.

About half of the February gain in production was absorbed in increased runs to stills, the remainder resulting in a stock build-up of about 2,250,000 barrels.

Fuel Yield High

Daily average crude runs to stills were 3,641,000 barrels, 41,000 barrels over January. The gasoline yield showed little change at 36.6 percent a rise of only 0.1 percent, but the residual yield reached 30.2 percent, the highest in more than 10 years.

Total demand for motor fuel was about 38,800,000 barrels, or 13 percent under February, 1942. The reduction in gasoline yield continued to outweigh the cuts in consumption, with the result that the seasonal increase in finished stocks was only about 4,400,000 barrels, compared with an average of 7 or 8 million. Total stocks of finished and unfinished gasoline on February 28 amounted to 92,848,000 barrels, compared with 108,297,000 barrels on the same date last year.

Total domestic production for the month included 108,399,000 barrels of crude and 6,840,000 barrels of natural gasoline, etc., an aggregate of 115,239,000 barrels. There was a downward change of 275,000 barrels in stocks of all oils, which at the close of the month consisted of 237,075,000 barrels of gasoline-bearing crude, 10,394,000 barrels of heavy crude in California, 4,996,000 barrels of natural gasoline and 245,120,000 barrels of refined products, a total of 497,585,000 barrels.

Bureau of Labor Statistics figures placed the price index for petroleum and products in February at 61.2, compared with 60.8 in January and 58.9 in February of last year. The crude capacity represented in the report was 4,635,000 barrels, giving an operating ratio of 79 percent, the same as in January, compared with 81 percent in February, 1942.

Better Allowables and Price Prospects Accelerate Trades

Acquisition of producing properties in West Texas by substantial interests has been accelerated by the early prospects of an advance in crude prices and substantial hike in allowables.

General American Oil Company, Dallas, made its entry into the Basin through the purchase of Osage Drilling Company's holdings in Wasson, Seminole and Emma fields for $1,250,000 cash and $2,000,000 payable from 30 percent of the gross production. Osage Drilling Company will own one-third working interest after the oil payment is liquidated. The deal involves full interest in 41 wells with potential of 36,800 barrels and base allowable of 1114 barrels daily, and half interest in 16 wells rated at 13,720 barrels potential and base allowable of 533 barres daily.

Woodley Petroleum Company, Houston, became an active producing unit through the purchase of 99½ percent of the capital stock of Llano Oil Company for $400,000 cash. Officials of the purchaser have been installed as officers of Llano Oil Company, which has eight wells, including a Holt pay well, in North Cowden field, and scattered interests in Andrews, Ward and Winkler Counties.

Stanolind Oil & Gas Company and Phillips Petroleum Company remain the foremost buyers of large properties, and in recent months have competed for possession of substantial holdings. Stanolind Oil & Gas Company is credited with having contracted to purchase 10 or more of the 20 producing wells held by Basin States Oil Company in the Wasson field for $69,000 cash, each, and assume indebtedness applicable to each. Basin States Oil Company was assigned 800 acres in June, 1939, by Honolulu Oil Corporation, which retained mineral rights below 6000 feet, and one-eighth over-ride until development costs are amortized, then ownership will be on 50-50 basis. Stanolind Oil & Gas Company is also listed as prospective buyer of Ralph Lowe et al's 24 wells on 1700 acres in the Keystone and Weiner fields, Winkler County. Majority of these leases involve over-ride with deep rights reserved. However, purchaser's interest is largely predicted on available deep rights due to the discovery of Ellenburger production in the Keystone field.

Northern Ordnance to Wildcat in Montana

Northern Ordnance Company of Minneapolis, which a few months ago started drilling wildcat wells in several states, has completed a deal with The Carter Oil Company for several lease blocks in northern Montana, and has contracted with Loffland Drilling Company of Tulsa for five rotary rigs for use in the Sweetgrass Arch area.

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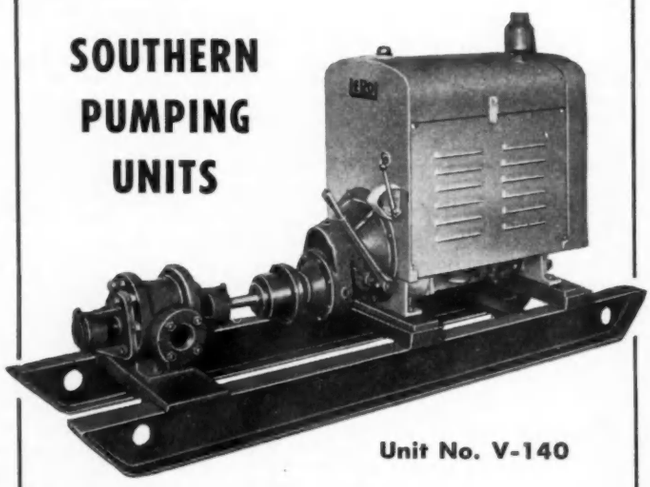

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Wholesale Prices of Refined Products in Principal Markets

REFINED GASOLINE	Current Range (Cents a gal.)		Changes from Month Ago	
Oklahoma Refineries:				
60 Octane and Under	5⅛	5¼	...	...
63-66 Octane	5⅛	5⅝	...	...
72-74 Octane	5⅞	6	...	...
78 Octane, Ethyl	6¾	6⅞	...	...
Mid-Western Tank Car:				
60 Octane and Under	5⅛	5¼	...	...
63-66 Octane	5⅛	5⅝	...	...
72-74 Octane	5⅞	6	...	...
78 Octane, Ethyl	6¾	7⅛	...	...
New York Harbor:				
68-70 Octane	9¼	9¼	...	...
72-74 Octane	9¼	9⅜	...	...
†Gulf Coast:				
60 Octane unleaded	5	5	...	...
65 Octane unleaded	5¼	5¼	...	...
68 Octane unleaded	5½	6⅝	+⅛	...
70 Octane unleaded	5⅝	5⅜	...	...
63-65 Octane leaded	5⅜	5⅜	...	...
72-74 Octane leaded	6¾	5¾	...	...
Min. 80 Octane, '39 Research	6	6⅞	...	...
NATURAL GASOLINE				
Grade 26-70:				
F.O.B. Group 3	3⅞	3⅞	...	...
F.O.B. Br'kenr'ge, Tex.	3½	3½	...	...
KEROSINE				
Oklahoma Refineries:				
41-43 water white	4⅜	4½	...	...
42-44 water white	4½	4½	...	...
Mid-Western Tank Car:				
41-43 water white	4⅜	4⅜	...	...
42-44 water white	4½	4½	...	...
New York Harbor	7⅛	7⅛	...	...
†Gulf Coast:				
41-43 water white	4⅛	4⅛	...	...
RANGE OIL				
At Oklahoma Refineries	4	4⅛	...	...
In Mid-Western Market Group 3, basis	4	4	...	...
LIGHT FUEL OILS				
Oklahoma Refineries:				
No. 1 prime white	3⅞	3⅞	...	...
No. 1 straw	3⅞	4	...	...
No. 2 straw	3⅝	3⅝	...	...
No. 3	3½	3½	...	...
Mid-Western Tank Car:				
No. 1 prime white	3⅞	3⅞	...	...
No. 2 straw	3⅝	3⅝	...	...
No. 3	3½	3½	...	...
New York Harbor:				
No. 1	7⅛	7⅛	...	...
No. 2	6¾	6¾	...	...
No. 3	6¾	6¾	...	...
†Gulf Coast:				
No. 2	3¾	3¾	...	...
DIESEL & GAS OILS (Cents per gallon, cargoes, according to Diesel index number)				
Below 43 di.	3¾	3¾	...	...
43-47 di.	3⅞	4	...	...
48-52 di.	3⅞	4	...	...
53-57 di.	4	4⅛	...	...
58 and above	4¼	4¼	...	...

HEAVY FUELS	Current Range (Per Bbl.)		Changes from Month Ago	
Oklahoma Refineries:				
No. 6	...	...	...	...
14-16 Gravity	$0.97	$0.97	...	...
Mid-Western Tank Car:				
No. 5	.85	.85	...	...
No. 6	.80	.80	...	...
New York Harbor:				
No. 5	1.95	2.01	...	...
No. 6	1.65	2.07	...	...
BUNKER C FUEL OIL (Per barrel, ships' bunkers)				
†Gulf Coast	$0.85	$1.27	...	...
New York Harbor	1.65	2.07	...	...
DIESEL OIL, HEAVY (Per barrel, ships' bunkers)				
†Gulf Coast 25 grav.	$1.65	$1.65	...	...
New York Harbor	2.78	2.78	...	...
LUBRICATING OIL (Cents a gallon)				
Oklahoma Refineries:				
Bright stock (viscosity at 210°):				
200 vis. D, 10-25 pour point	.27	27	...	...
150-160 vis. D:				
0-10 pour point	.23	23	...	...
10-25 pour point	22½	23	...	...
25-40 pour point	.23	23	...	...
150-160 vis. E	.22	22	...	...
120 vis. D, 0-10 pour point	.22	22	...	...
Cylinder Stocks:				
600 s.r. dark green	8½	8½	...	...
600 s.r. olive green	.10	11	...	...
631 s.r.	18½	18½	...	...
Neutral Oils (viscosity at 100°, 0-10 pour point):				
Pale Oils:				
60- 85 vis. No. 2 color 8	8	8	...	...
86-110 vis. No. 2 color 8½	8½	8½	...	...
150 vis. No. 3 color	14½	14½	...	...
180 vis. No. 3 color	15	15	...	...
200 vis. No. 3 color	15	15	...	...
250 vis. No. 3 color	16½	16½	...	...
280 vis. No. 3 color	17	17	...	...
300 vis. No. 3 color	18	18	...	...
Red Oils:				
180 vis. No. 5 color	15	15	...	...
200 vis. No. 5 color	15	15	...	...
280 vis. No. 5 color	...	...	...	...
300 vis. No. 5 color	17½	17½	...	...
Western Pennsylvania: Cylinder Stocks:				
600 s.r. filtrable	15	15	...	...
650 s.r.	15½	15½	...	...
600 flash	16	16	...	...
630 flash	17	17	...	...

LUBRICATING OIL (Cents a gal.)			Changes from Month Ago	
Bright Stock (No. 8 Color, 145-155 vis. at 210°, 540-550 fl.):				
10 pour test	30½	30½	...	...
15 pour test	29½	29½	...	...
25 pour test	25	25	...	...
Viscous Neutrals (No. 3 Color, vis. at 70°):				
200 vis. (180 at 100), 420-425 fl.:				
Zero pour test	31½	31½	...	...
10 pour test	30½	30½	...	...
15 pour test	29½	29½	...	...
25 pour test	23	26	...	...
150 vis. (143 at 100), 400-405 fl.:				
Zero pour test	29½	29½	...	...
10 pour test	28½	28½	...	...
15 pour test	27½	27½	...	...
25 pour test	21	24	...	...

EASTERN STATES CRUDE OIL PRICES

FIELD—	Flat Price	Date Posted
Bradford-Allegany	$3.00	3-26-42
Sw. Pa. Pipe Line	2.65	3-26-42
Eureka Pipe Line, W. Va.	2.59	3-26-42
Corning Grade, Ohio	1.31	5-27-41
Buckeye Crude, Ohio	2.30	6-18-41

MAJOR CRUDE OIL PRICE CHANGES

	Penna. Grade	Mid-Cont. (36 Gr.)	Calif. (26 Gr.)
May 22, 1940	Cut 25	.....	.....
June 18, 1940	Cut 25	.....	.....
July 12, 1940	Cut 25	.....	.....
Aug. 28, 1940	Cut 15	.....	.....
Nov. 12, 1940	Up 15	.....	.....
Dec. 17, 1940	Up 15	.....	.....
Jan. 27, 1941	Up 15	.....	.....
April 1, 1941	.....	Up 5	.....
April 23, 1941	Up 10	.....	.....
May 19, 1941	.....	Up 10	.....
May 21, 1941	Up 15	.....	.....
June 18, 1941	Up 20	.....	.....
Aug. 14, 1941	Up 23	.....	.....
Aug. 25, 1941	Cut 23	.....	.....
March 26, 1942	Up 25	.....	.....
April 1, 1943	...	...	Up ‡25

† Cargoes, domestic and export.
‡ 14 and 15 gravity.

CRUDE OIL PRICES IN CALIFORNIA

Prices per barrel in field, posted by Standard Oil Company of California, effective April 1, 1943.
All gravities above those quoted take highest price offered in that field.

GRAVITY	Signal Hill (Long Beach)	Wilmington	El Segundo	Seal Beach	Huntington Beach	Inglewood	Olinda, Brea Canon	Athens-Rosecrans	Torrance	Richfield	Whittier, East Coyote (La Habra)	Montebello	West Coyote Hills	Santa Fe Springs	Newhall, Kern River, Kern Front, McKittrick, Round Mountain	Greeley, Canal, Wasco	Coles Levee	Mountain View	Elk Hills, Buena Vista Hills, Midway-Sunset, Lakeview Area	Lost Hills	Coalinga	Wheeler Ridge	Kettleman Hills	Elwood Terrace
14-14.9	.....	$0.93	.....	.....	$0.96	.....	$0.95	.....	$0.95	$0.95	$0.95	$0.97	.....	.....	$0.98	.....	.....	.....	$0.98	$0.98	$0.98	.....	.....	.....
15-15.9	.....	.96	.....	.....	1.00	$1.01	.97	.....	.97	.96	.97	.97	.....	.....	*Playa	.....	.....	.....	.98	.98	.98	.....	.....	.....
16-16.9	.....	.96	$1.01	.....	1.00	1.01	.97	.....	.97	.96	.97	.97	.....	.....	del	.....	.....	.....	.98	.98	.98	.....	.....	.....
17-17.9	.....	.96	1.01	.....	1.00	1.01	.97	.....	.97	.96	.97	.97	.....	.....	Rey	.....	.....	.....	.98	.98	.98	.....	.....	.....
18-18.9	$0.93	.96	1.01	.....	1.00	1.01	.97	.....	.97	.96	.97	.97	.....	.....	.88	.....	.....	.....	.98	.98	.98	.....	.....	.....
19-19.9	.93	.96	1.01	.....	1.00	1.01	.97	.....	.97	.96	.97	.97	.....	.....	.88	.....	.....	$0.98	.98	.98	.98	.....	.....	.....
20-20.9	.93	.96	1.01	.....	1.00	1.01	.97	.....	.97	.96	.97	.97	.....	.....	.88	.....	.....	.98	.98	.98	.98	.....	.....	.....
21-21.9	.93	.96	1.01	.....	1.00	1.01	.97	.....	.97	.96	.97	.97	.....	.....	.88	.....	.....	.98	.98	.98	.98	.....	.....	.....
22-22.9	.96	.98	1.02	$0.88	1.00	1.01	.97	.....	.97	.96	.97	.97	.....	.....	.88	.....	.....	.98	.98	.98	.98	$0.95	.....	.....
23-23.9	1.00	1.02	1.05	.92	1.02	1.01	.98	.....	.97	.98	1.00	.97	.....	.....	.91	.....	.....	.98	.99	.98	.98	.95	.....	.....
24-24.9	1.03	1.06	1.07	.97	1.05	1.04	1.01	.....	1.01	1.02	1.03	.97	$0.99	.....	.95	.....	.....	98	1.03	.99	.98	.95	.....	.....
25-25.9	1.07	1.09	1.10	1.01	1.08	1.07	1.04	.....	1.05	1.06	1.07	.98	1.02	.....	.99	.....	.....	.98	1.07	1.01	.98	.....	.....	.....
26-26.9	1.11	1.12	1.12	1.06	1.11	1.10	1.08	.....	1.09	1.10	1.11	1.01	1.06	.....	1.03	.....	.....	.98	1.11	1.04	.98	.....	.....	.....
27-27.9	1.15	1.15	1.15	1.10	1.14	1.14	1.11	.....	1.13	.....	1.15	1.05	1.10	$1.04	.....	.....	.....	1.01	1.15	1.07	.98	.....	.....	.....
28-28.9	1.18	1.18	1.17	1.15	1.17	1.17	1.14	.....	1.17	.....	.....	1.08	1.13	1.08	.....	.....	.....	1.04	1.19	1.10	1.00	.....	.....	.....
29-29.9	1.20	1.21	.....	1.19	1.20	1.20	.....	$1.17	.....	.....	.....	1.12	1.17	1.12	.....	.....	.....	1.07	1.24	1.13	1.02	.....	.....	.....
30-30.9	1.23	1.24	.....	.....	1.23	1.22	.....	1.21	.....	.....	.....	1.15	1.21	1.15	.....	$1.01	$1.09	1.10	1.28	1.16	1.04	.....	.....	FOB
31-31.9	.....	.....	.....	.....	.....	1.24	.....	1.25	.....	.....	.....	1.19	1.24	1.19	.....	1.04	1.12	1.14	.....	.....	1.06	.....	.....	Ship
32-32.9	.....	.....	.....	.....	.....	.....	.....	1.29	.....	.....	.....	1.23	1.28	1.23	.....	1.07	1.14	1.17	.....	.....	1.09	.....	.....	.....
33-33.9	.....	.....	.....	.....	.....	.....	.....	1.32	.....	.....	.....	1.27	.....	1.26	.....	1.10	1.17	.....	.....	.....	1.11	.....	.....	$1.22
34-34.9	.....	.....	.....	.....	.....	.....	.....	1.36	.....	.....	.....	1.31	.....	1.30	.....	1.13	1.20	.....	.....	.....	1.13	.....	.....	1.25
35-35.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.35	.....	.....	.....	1.16	1.22	.....	.....	.....	.....	.....	$1.23	1.28
36-36.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.39	.....	.....	.....	1.19	1.25	.....	.....	.....	.....	.....	1.26	.....
37-37.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.43	.....	.....	.....	1.22	.....	.....	.....	.....	.....	.....	1.29	.....
38-38.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.47	.....	.....	.....	1.25	.....	.....	.....	.....	.....	.....	.....	.....
39-39.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.51	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
40-40.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.53	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* Effective April 1, 1943, posted by Union Oil Company of California.

Gravity-Scale Crude Oil Prices in Mid-Continent Fields

Posted in most instances between May 19 and May 21, 1941

GRAVITY	Oklahoma-Kansas		North Louisiana-Arkansas					Inland Texas and New Mexico			South Texas		Texas Gulf Coast			Louisiana Gulf Coast							
	Stanolind, Gulf, Texas, Skelly, Barnsdall, Tidewater, Sinclair, Phillips	Carter, Magnolia, Shell	[1]Rodessa, etc.	[2]Champagnolle, etc.	Bankie, Eola, Olla, S. Olla, Little Crk. (by Standard)	Lisbon, La (by Gulf)	[3]Atlanta, Buckner, etc., Ark.	North and West Central Texas	[4]Eastern Texas	West Texas, [17]Panhandle, New Mexico	[5]Refugio Type	[6]Mirando Type	[7]Gulf Coast	[8]Anahuac Type	[9]Dickinson Type	[10]Gulf Coast	[11]Standard of La.	[12]Texas Co.	[13]Texas Co.	[14]Magnolia Pet. Co.	[15]Shell Oil Co.	Jennings (by Gulf)	[16]Rocky Mt. Area (Salt Creek, etc.
17-17.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	$0.94	....	....	....
18-18.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.96	....	....	....
19-19.9	....	....	....	....	....	....	....	....	$0.80	$0.70	$1.08	$1.03	$1.06	$0.98	$0.93	$1.06	....	....	....	.98	$0.99	....	....
20-20.9	$0.85	$0.75	....	....	....	....	$0.68	$0.81	.82	.72	1.10	1.05	1.08	1.00	.95	1.08	$0.90	....	....	1.00	1.01	....	....
21-21.9	.87	.78	....	....	....	....	.70	.83	.84	.74	1.12	1.07	1.10	1.02	.97	1.10	.92	....	....	1.02	1.03	....	....
22-22.9	.89	.81	....	....	....	....	.72	.85	.86	.76	1.14	1.09	1.12	1.04	.99	1.12	.94	....	....	1.05	1.05	....	....
23-23.9	.91	.84	....	....	....	....	.74	.87	.88	.78	1.16	1.11	1.14	1.06	1.01	1.14	.96	....	....	1.08	1.07	....	....
24-24.9	.93	.87	$0.88	$0.86	$1.03	....	.76	.89	.90	.80	1.18	1.13	1.16	1.08	1.03	1.16	.98	....	....	1.11	1.09	....	....
25-25.9	.95	.90	.90	.88	1.05	....	.78	.91	{.97 .92	.82	1.20	1.15	1.18	1.10	1.05	1.18	1.00	....	....	1.14	1.11	....	....
26-26.9	.97	.93	.92	.90	1.07	....	.80	.93	.99	.84	1.22	1.17	1.20	1.12	1.07	1.20	1.02	....	....	1.17	1.13	....	....
27-27.9	.99	.96	.94	.92	1.09	$0.81	.82	.95	1.01	.86	1.24	1.19	1.22	1.14	1.09	1.22	1.04	....	....	1.19	1.15	....	....
28-28.9	1.01	.99	.96	.94	1.11	.83	.84	.97	1.03	.88	1.26	1.21	1.24	1.16	1.11	1.24	1.06	$1.06	....	1.21	1.17	....	$0.96
29-29.9	1.03	1.02	.98	.96	1.13	.85	.86	.99	1.05	.90	1.28	1.23	1.26	1.18	1.13	1.26	1.08	1.08	....	1.23	1.19	....	.98
30-30.9	1.05	1.05	1.00	.98	1.15	.87	.88	1.01	1.07	.92	1.30	1.25	1.28	1.20	1.15	1.28	1.10	1.10	$1.05	1.25	1.21	....	1.00
31-31.9	1.07	1.07	1.02	1.00	1.17	.89	.90	1.03	1.09	.94	1.32	1.27	1.30	1.22	1.17	1.30	1.12	1.12	1.07	1.27	1.23	$1.07	1.02
32-32.9	1.09	1.09	1.04	1.02	1.19	.91	.92	1.05	1.11	.96	1.34	1.29	1.32	1.24	1.19	1.32	1.14	1.14	1.09	1.29	1.25	1.09	1.04
33-33.9	1.11	1.11	1.06	1.04	1.21	.93	.94	1.07	1.13	.98	1.36	1.31	1.34	1.26	1.21	1.34	1.16	1.16	1.11	1.31	1.27	1.11	1.06
34-34.9	1.13	1.13	1.08	1.06	1.23	.95	.96	1.09	1.15	1.00	1.38	1.33	1.36	1.28	1.23	1.36	1.18	1.18	1.13	1.33	1.29	1.13	1.08
35-35.9	1.15	1.15	1.10	1.08	1.25	.97	.98	1.11	1.17	1.02	1.40	1.35	1.38	1.30	1.25	1.38	1.20	1.20	1.15	....	....	1.15	1.10
36-36.9	1.17	1.17	1.12	1.10	1.27	....	1.00	1.13	1.19	1.04	1.42	1.37	1.40	1.32	1.27	1.40	1.22	1.22	1.17	....	....	1.17	1.12
37-37.9	1.19	1.19	1.14	1.12	1.29	....	1.02	1.15	1.21	1.06	1.44	1.39	1.42	1.34	1.29	1.42	1.24	....	1.19	....	....	1.19	1.14
38-38.9	1.21	1.21	1.16	1.14	1.31	....	1.04	1.17	1.23	1.08	1.46	1.41	1.44	1.36	1.31	1.44	1.26	....	1.21	....	....	1.21	1.16
39-39.9	1.23	1.23	1.18	1.16	1.33	....	1.06	1.19	1.25	1.10	1.48	1.43	1.46	1.38	1.33	1.46	1.28	....	1.23	....	....	1.23	1.18
40 & Up	1.25	1.25	1.20	1.18	1.35	....	1.08	1.21	1.27	1.12	1.50	1.45	1.48	1.40	1.35	1.48	1.30	....	1.25	....	....	1.25	1.20

[1] Gulf schedule for Caddo, Homer, Haynesville, Bull Bayou, Crichton, De Soto, El Dorado and Rodessa, Texas. Standard of La. schedule for Cotton Valley, Rodessa, Shreveport (Cross Lake), and Caddo. Magnolia schedule for Haynesville, Cotton Valley, Rodessa, and Miller Co., Ark. Texas Co. schedule for "North Louisiana."

[2] Schedule of Standard of La. for Catahoula Lake, Elm Ridge, Hemphill, De Soto, Sabine, Fouke, Homer, Miller Co., Sugar Creek. Schedule of Root Petroleum Co. for Nick Springs, Urbana light, Schuler sweet, Rainbow, South Field (El Dorado), and Champagnolle.

[3] Schedule of Standard of La. for Atlanta, Buckner, Magnolia, Patton, Schuler: Jones sand, Village. Schedule of Root Petroleum Co. for Schuler: Reynolds lime, and Schuler: Jones sand.

[4] Humble schedule for Anderson, Cherokee, Limestone, and Navarro counties and Navarro Crossing field, except that prices from 80 to 92 cents represent postings only for Hawkins field, Wood County. Rodessa, Texas, prices are same as in Rodessa, La.-Ark.

[5] Schedule for Refugio, E. White Point, Greta, Melon Creek, Midway, Minnie Bock, O'Connor-McFaddin, Plymouth, Saxet, Taft, and Tom O'Connor.

[6] Schedule for Blanchard, Bridwell, Colorado, Comitas, Eagle Hill, Escobas, Fitzsimmons, Glen, Government Wells (N. and S.), Heyser, Hoffman, Kelsey, Kohler, Loma Novia, Lundell, Manila, Mirando Valley, Placedo, Randado, Sarnosa, and Tesoro.

[7] Humble schedule for Amelia, Clear Lake, Goose Creek, Hastings, Magnet, Mykawa, Mykawa new, Raccoon Bend, South Thompsons, Sugarland, Thompsons, Webster. Texas Co. schedule for Ariola, Ganado, Hamman, Hillje, Humble, Kubela, Magnet, Manvel, Markham, Mauritz, Old Ocean, Pickett Ridge, Port Neches, Sour Lake, West Columbia, Withers; except that schedule provides $1.36 top, 24 gravity. Pan American Prod. Co. schedule for Hastings and South Houston. Gulf schedule for Spindle Top, Sour Lake, Lovells Lake, West Beaumont, Goose Creek, South Liberty, Big Creek, Blue Ridge, Fannett, Moore, Barbers Hill, Hankamer, Thompsons, Lochridge, Dyersdale, and Hull (old) crudes. Sun schedule for Barbers Hill, Batson old, Cotton Lake, Esperson below 35 gravity, Goose Creek, Greens Lake, Hull below 25, Humble below 35, Nome, North Dayton below 25, Orange, Saratoga, Sour Lake, South Liberty.

[8] Humble schedule for Anahuac, Angleton, Cedar Point, Fishers' Reef, Hull old and new, Pierce Junction, Red Fish Reef, Turtle Bay fields. Sun schedule for Anahuac, Caplen, and Turtle Bay. Gulf schedule for Anahuac, Hull new, Pierce Junction, Orange and Thompsons deep.

[9] Humble schedule for Dickinson, Gillock, Hardin, League City, and Rowan fields. Pan American Prod. Co. schedule for Gillock crude.

[10] Sun Oil Co. schedule for Bayou Blue, Chacahoula, Fausse Pointe, Hackberry (E. and W.), and Vinton. Texas Co. schedule for Bay St. Elaine, Caillou Island, Iberia, Lake Barre, Lake Pelto, Leesville and Port Barre for crude ranging in gravity up to 27-27.9; for lighter oils in those fields see Footnote 12. Gulf schedule for Edgerly, Starks, Vinton, E. Hackberry, Cameron Meadows, Leesville. Deduct 10 cents for Gulf's prices for Timbalier Bay, Grand Bay, Quarantine Bay, and West Bay. Deduct 2 cents for Standard of La. prices for University (Baton Rouge) crude of 30 to 35.9 gravity.

[11] Standard of La. schedule for Bayou Mallet, Bayou Sale, Choctaw, Darrow, Jeanerette, Lirette, N. Crowley, S. Crowley, Fort Barre, Fotash, Roanoke, St. Martinville. Deduct 10 cents for Anse La Butte.

[12] Texas Co. schedule for Bateman Lake, Dog Lake, Fausse Point, Horseshoe Bayou, Jefferson Island, Plumb Bob, Vermilion Bay, West Cote Blanche, and Delta Duck Club. Add 8 cents to these prices for Texas Co. postings for 28 or higher gravity at Bay St. Elaine, Caillou Island, Iberia, Lake Pelto, Leesville, Port Barre, and Lake Barre.

[13] Texas Co. schedule for Delta Farms, Golden Meadows, Lake Salvador. Also Standard of La. for Golden Meadows.

[14] Magnolia schedule for Lockport, Cameron Meadows, West Gueydan.

[15] Shell Oil Co. schedule at Iowa, Black Bayou, White Castle. For Shell's prices at Roanoke and Chalkley fields deduct 5 cents. For Shell's prices at Gibson, South Houma, Hester, and West Lake Verret fields deduct 10 cents.

[16] Sinclair-Wyoming Oil Co. prices at Salt Creek, Lost Soldier, Iron Creek, effective May 20, 1941. Deduct 10 cents for East Mahoney and deduct 20 cents for Mahoney and Wertz.

[17] Add 3 cents for Panhandle prices.

MID-CONTINENT FLAT PRICES

FIELD—	Flat Price	Date Posted
Arkansas:		
Big Crk., Columbia, McKamie, Macedonia, Dorcheat, sour dist.	$1.25	2- 3-43
Dorcheat, Macedonia dist'l.	1.30	11-16-42
Smackover, Heavy	.83	5-22-41
Texarkana sweet distillate	1.40	-42
Louisiana, North:		
Cotton Valley Distillate	1.40	9- 1-41
Cotton Valley (Holloway sn.)	1.25	5-22-41
Lisbon Distillate	1.20	5-22-41
Urania	1.15	5-22-42
Louisiana, South:		
Erath	1.21	5-21-41
Garden Island	1.36	5-21-41
Happytown	1.15	5-20-41
Lafitte, Paradis	1.19	5-21-41
Lake Arthur & Tepetate	1.18	5-21-41
Lake Mongoulois	1.36	5-21-41
Ville Platte	1.20	5-21-41
Nebraska:		
Falls City, in field	.90	8- 1-41
Falls City, in tank cars	.95	8- 1-41
Shubert, in tank cars	.97	8- 1-41
Texas:		
Alice, Benavides (No. Sweden), Ben Bolt, Clark-Muil, Sun and Tom Graham	1.35	5-21-41
Cayuga	.90	5-21-41
Chapel Hill 50° and up	1.25	3-19-42
Chapel Hill below 50°	1.18	1-20-42
Clay Creek	1.00	5-22-41
Cleveland	1.26	5-21-41
Conroe	1.43	5-21-41
Esperson 35° & up; S. Esperson (Sun Oil)	1.30	5-22-41
East Texas, Flag Lake	1.25	5-20-41
Flour Bluff, East Flour Bluff, and La Rosa	1.33	5-21-41
Hockley-Cochran Counties	.87	5-21-41
Livingston, Cleveland	1.25	5-20-41
Long Lake	1.23	5-21-41
Luling	1.05	5-21-41
Lytton Springs	1.17	5-21-41
North Rincon	1.45	2- 3-43
Salt Flat, North Salt Flat, Darst Creek, Hilbig, Carroll, Clark, Zoboroski	1.14	5-21-41
Satsuma, Tomball	1.40	5-21-41
Sun Oil Co. at Batson (new), Fig Ridge, Hardin, Hull 25 and up, Humble 35 and up, LaBelle, N. Dayton 25 and up, Oyster Bayou, Seabreeze, S. China, W. Orange and Willow Slough	1.25	5-22-41
South Cotton Lake	1.35	5-22-41
Sun, N. Sun, N. Rincon, Garcia	1.35	5-22-41
Talco	.79	5-21-41
Van	1.08	5-21-41
Yates (Deep)	.95	5-20-41
Yates (Shallow)	.82	5-20-41
Yturria (Sun in S. Texas)	....	....

MICHIGAN PRICES

Central (Basin):		
Porter, Greendale, Crystal, Wise, Midland, Vernon, Saginaw	$1.44	5-27-41
Buckeye, Edenville, Bentley, Beaverton, Monitor, Kawkawlin	1.42	5-27-41
Freeman, Lincoln, Sherman Redding, Temple, Winterfield, Trenton-Monroe Co., Fork Twa.-Mecosta Co.	1.39	5-27-41
Hamilton-Grout	1.29	5-27-41
Adams	1.27	6- 1-41
Arenac, Clayton, Ogemaw, W. Branch	1.24	5-27-41
Southwest (Shallow):		
Traverse, crude in Allegan, Kent, Ottawa, Van Buren Counties	1.45	6- 2-41
Clare	1.11	5-27-41

MIDDLE WEST PRICES

FIELD—	Flat Price	Date Posted
Lima, Ohio-Ind.	$1.50†	10-28-42
Illinois Basin (Sohio Corp.)	1.37	5-19-41
Lake Centralia-Salem, Illinois	1.37	5-19-41
Eastern Ill.-Western Ind.	1.22	5-21-41
Plymouth, Illinois	1.05	4-28-43
Western Kentucky	1.32	5-21-41
Birk City, Western Kentucky	1.32	5-21-41
Kentucky River, Eastern Ky.	1.43	6-19-41
Big Sandy River, Eastern Ky.	1.38	6-19-41
Cleveland, Lodi, Chatham, Ohio	1.30	9- 1-41

ROCKY MOUNTAIN STATES PRICES

Colorado:		
Canon City and Florence	$1.05	5-21-41
Iles	1.07	5-20-41
Montana:		
Cat Creek	1.15	4- 1-41
Cut Bank (6 Buyers)*	1.05-1.20	3-30-42
Dry Creek	1.02	5-20-41
Sunburst	1.00	5-20-41
New Mexico:		
Artesia	.94	5-21-41
Hogback	1.00	10-11-38
Wyoming:		
Big Muddy	1.08	5-30-41
Byron	.70	3- 4-43
Elk Basin	1.00	5-21-41
Elk Basin, Black	.90	4-28-43
Frannie, Light	.85	2-26-43
Frannie, Heavy	.62	2-26-43
Garland	.60	3- 4-43
Grass Creek, Light	1.00	5- 1-41
Grass Creek, Heavy	.65	4- 1-43
Hamilton Dome	.60	2-26-43
Lance Creek (Ohio Oil Co.)	1.12	7- 1-41
Mill Creek	.72	10-11-38
Oregon Basin	.65	3- 4-43
Osage	1.30	10-11-38
Poison Spider	.65	2-26-43
Rock River	1.15	5-21-41
Salt Creek, Tensleep Heavy	0.8285	2-27-43

*About 25% of Cut Bank crude brings $1.20 per barrel; 65% less than $1.20 and minimum $1.10; and 10% less than $1.10.

†$1.50-price applies to about ¾ of field's production; $1.60 to ¼ of it.

International Developments

New Venezuelan Oil Law Adopted

The proposed new Venezuelan petroleum law (discussed in detail in THE OIL WEEKLY of March 1, 1943) was submitted to a special session of the Congress of Venezuela late in February and was immediately passed, signed by the President, and legally took effect on March 13, 1943. It will not apply to pre-existing contracts until the holders of these contracts express their election to have their titles converted into new contracts under the new law. At the same time the Venezuelan congress amended the buoy tax law to exempt from the tax vessels carrying petroleum or petroleum products.

Holders of concession contracts have two months from the passage of the law to advise the government whether they wish to obtain new contracts under the new law. To compensate for the increased financial burdens imposed by the law, there are several substantial advantages to be derived from the conversion, one of the principal ones being the extension of the contract rights for a new term of 40 years. It is expected that all or substantially all of the companies operating in Venezuela will elect to obtain new contracts and will so advise the government within the two months which the law grants for the purpose.

Spanish Plan to Build Refinery in Cartagena

Under the Spanish government's present program of economic self-sufficiency a supplementary expenditure of 40,000,000 pesetas was authorized by Spanish law to finance the installation of an oil refinery in Cartagena for Empresa Nacional de Combustibles y Lubricantes.

This company, created in January, 1942, plans to develop a concession in the Spanish oil-shale regions near Cartagena.

China Develops Output of Petroleum and Substitutes

China's liquid-fuel industry has been greatly developed since the important oil fields in the Province of Kansu were geologically surveyed in 1934-1937. Prospecting and drilling have established the fact that this field has a very rich reserve and that production on a large scale is possible.

Fourteen producing wells have been completed, including three which yield great quantities at considerable pressure. Two refineries have been erected, one to produce straight distillates, situated in the field, and the other, located east of the field, having a semi-cracking unit. Both refineries produce gasoline, kerosine and diesel oil.

Because of the gasoline shortage, the National Resources Commission of the Ministry of Economic Affairs has undertaken production of alcohol and other gasoline substitutes. There are 10 alcohol plants in operation, with a total annual capacity of more than 3,000,000 gallons of ethyl alcohol, one of which produces absolute alcohol suitable for aviation use.

A vegetable-oil cracking plant which produces gasoline substitute and diesel oil from tung oil, has been erected in Chungking. Various grades of lubricating oil are also produced.

Also, a low-temperature coal-distillation plant has been set up in western Szechwan where gasoline substitute, diesel oil, crude phenol and semi-coke are produced from bituminous coal, which exists in large quantities. The octane number of the gasoline substitute produced in this plant is high enough for aviation purposes.

Oil Development in Chile Under Government Control

Corporación de Fomento de la Producción has recently taken over control of petroleum exploration work, drilling, and similar activities in the Magallanes zone of Chile. This work was formerly carried out under the Bureau of Mines and Petroleum of the Ministry of Economy and Commerce. The sum of 15,000,000 pesos has been allocated to the corporation for this work.

There are indications that petroleum exists in the Province of Arauco, according to the Ministry of Economy and Commerce, although it is not known whether commercial quantities are available.

Lago Defers Action on Merger with Creole

On a resolution offered by L. F. McCollum, representing stock of Standard Oil Company (New Jersey), stockholders of Lago Petroleum Corporation at a special meeting in New York April 23 deferred until May 7 action on the proposal to sell the company's Venezuelan properties to Creole Petroleum Corporation. (THE OIL WEEKLY April 26, 1943, p. 51.) Purpose of the postponement of action was to permit further study of the plan.

Lago stockholders at the April 23 meeting approved conversion of Lago concessions in Venezuela to conform to the new petroleum law of that country. This conversion extends producing concessions to 40 years, whereas the life of existing concessions is about 20 years.

Company to Help Find Needed Canadian Fields

Because Canada is producing only 17½ percent of its crude-oil requirements and discovery of a new oil field would greatly assist the war effort and Canada's economy, the McColl-Frontenac Oil Company, Ltd., is carrying on an aggressive oil exploration program, according to a statement by President J. M. Pritchard, contained in the firm's annual report.

"Since the inception of the program an amount in excess of $500,000 has been expended," Pritchard states. "The directors will continue in the prosecution of this effort as favorable opportunities present themselves.

"The exploration department, in its endeavor to discover new crude oil reserves, is accumulating all available geological information and data on wildcat drilling which may be of assistance in the search for new sources of crude oil in Canada," the statement said.

Mexico's Oil Policy May Be Undergoing Change

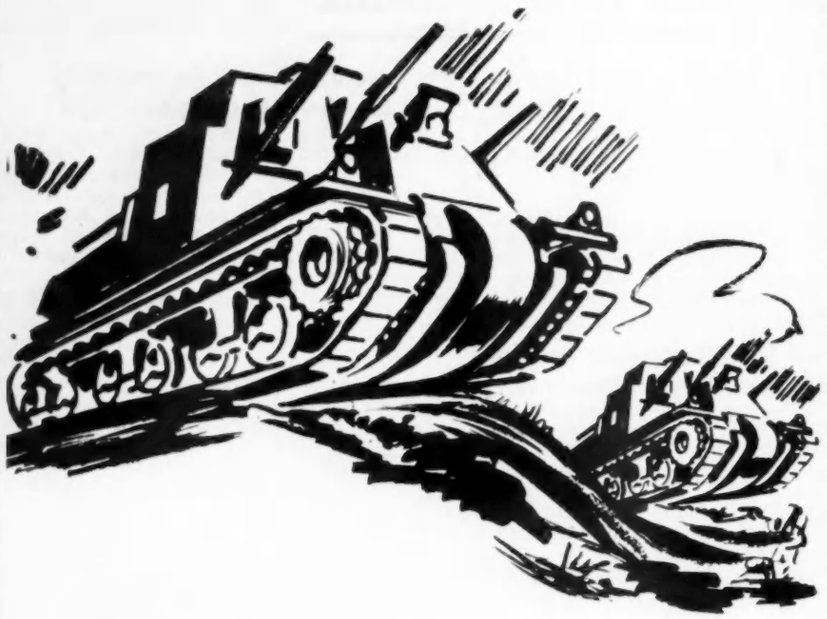
Although there might have to be major changes in policies of the Mexican government toward private, foreign-owned oil companies to cause the latter to be seriously interested in developing Mexico's oil resources, various recent events have indicated a more favorable attitude toward foreign capital.

An example was the ruling of the First District Court of the Federal District that existing laws do not prohibit the employment of foreign technicians in drilling for oil in Mexico. In granting a drilling permit to Compania Carbonifera de Ciudad Mier, S. A. (Mexican-owned), the Ministry of National Economy required that work be done exclusively by Mexican individuals or companies composed exclusively of Mexicans. But the company had contracted with an American drilling contractor, who had done work for the Mexican government company, to drill a wildcat, and on discovering the clause in the drilling permit requiring use of Mexican workers exclusively, Compania Carbonifera contended in court that the federal labor law and the existing petroleum law, only statutes applicable in the case, merely provided for employment of Mexican laborers in the percentage definitely fixed in those laws. The company was upheld in these contentions.

Reopening of the question of foreign oil exploitation was precipitated several months ago by published reports of impending development in Mexico by Panhandle Oil & Refining Company, which was credited with having acquired option to operate on certain privately owned unexpropriated properties. The reports prompted Narciso Bassols, Mexican diplomat, to address a public message to President Avila Camacho deploring possibility of return to Mexico of foreign oil interests. Thereupon National Economy issued a statement that Panhandle had no holdings in Mexico.

When Henry W. Wilson resigned from the presidency and board of Panhandle and was succeeded by Serge Rubinstein, New York financier, news reports out of New York in mid-December, 1942, stated that Wilson planned to assume direction of development of oil and gas properties recently acquired in Northern Mexico by American interests affiliated with British American Equities, Inc. Wilson has been in Mexico since the beginning of the year, and is experienced in dealing with Mexican government officials on oil matters, following long association with the late W. R. Davis.

Rulings several months ago in two pay claims cases in the oil industry of Mexico set precedents that are expected to have important effect henceforth on labor conditions. The Supreme Court held that Huasteca Petroleum (Standard Oil Company of New Jersey) need not obey the ruling of the Federal Board of Conciliation and Arbitration in 1941 that the company pay three former employes compensation equivalent to three months' wages plus 20 days' pay for each year of service, for dismissal. The court ruled that the com-



OIL KEEPS 'EM "ROLLING"

The precious life-blood of our armored forces . . . the tanks of Africa, the planes, trucks, and jeeps — will help write tomorrow's headlines! The United States and her allies are grateful for the increasing efforts put forth and the unfailing services rendered by the petroleum industry.

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pany was not responsible for ending of the contracts because its holdings had been expropriated; that the board itself had declared companies' work contracts broken on the eve of expropriation.

In another significant wage-claim ruling, the Federal Board of Conciliation and Arbitration upheld the demand for overtime pay by 225 employes of the government company, Petroleos Mexicanos, at the former Pierce refinery in Tampico. The expropriated companies had a 44-hour work week, but the government company is working its staff 48 hours weekly. The board ruled that the base pay of the employes must be 44 hours a week, with overtime pay for additional hours worked.

More Oil Drilling Tax Concessions in Canada

Criticism of oil-well-tax concessions announced by Canadian Finance Minister James L. Ilsley in his budget of March 2, as being insufficient to offset an expected slump in well drilling, has brought amendments to the budget tax proposals. Changes which will both extend budget benefits to present producing wells and modify depletion allowances to give the royalty-financed type of well a better deal, have been announced.

For wells spudded between January 1, 1943, and March 31, 1945, royalty trustees now are given an important alternative. Either the 33 1/3 percent depletion allowance can be taken for an indefinite period or a depletion rate of 100 percent can be taken until subscribed capital is returned with no depletion allowance granted thereafter. This should prove a boon to the company whose well is expected to be short-lived. If these wells take the 100 percent option, all income will be tax-free until capital is repaid.

Another amendment is apparently aimed at improving the income from oil wells generally, and since income from established wells is a major source of funds for new drilling, is expected to boost new production. According to this proviso, all wells, no matter when drilled, will be allowed to place a third of their income in the tax-free depletion category. Increased depreciation and development write-offs will now be allowed for 1942, and subsequent years.

Crown Company to Finance Turner Valley Drilling

Wartime Oils Ltd., Dominion government concern formed to increase Turner Valley production, will obtain its objective by financing with government funds drilling of wells on strictly proven areas of the valley field, according to information received by Calgary oil operators.

In other words, the paper said, the government will not risk its money on the financing of wells outside the known productive boundaries even if they are loosely classified as being on the Turner Valley structure.

The plan to be adopted by the crown company, it is understood, is to advance oil companies money for drilling proven sites they may have at Turner Valley.

When the well comes into production, Wartime Oils Ltd. will have first charge on production revenue and will receive its money back plus 3½ percent interest before royalty holders or the oil company concerned receive returns.

What Happens When a V-Belt Bends

FIG. 1

FIG. 2

435

This Test Shows the Very Real Advantage of the CONCAVE SIDE!

Grip the side-walls of *any* V-belt as it bends. You will *feel* its sides change shape. The top of the belt becomes narrower because it is under tension. The middle of the side-wall bulges out. You will see that a *straight-sided* V-belt must assume, when it bends, the shape shown in figure 1 (on the left)—a shape that *doesn't fit the sheave groove.*

Now try the same test with a Gates Vulco Rope. You will find that the *same shape change merely straightens* the precisely engineered Concave Side (See figure 2). There is no side-bulge. This insures uniform side-wall wear:—*longer life!* Moreover, the full side-wall of the belt uniformly grips the pulley. It therefore carries heavier loads without slipping—a saving in belts and also a saving in power.

Only belts built by Gates are built with the Concave Side, a Gates patent.

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U. S. Field Operations

Oklahoma

Grady County Gets Two Gas Extensions

Ohio Oil Company has extended the Cement field of Caddo County east into Grady County with a gas well at Laflin 1, C SW SW 7-n-8w. After hole was drilled to 6502 feet, casing was perforated in Kistler sand at 5730-5800 feet, showing for 6,000,000 cubic feet of gas and no oil. Testing continues.

Tide Water Associated Oil Company et al's Forman 1, C SE SW 15-5n-8w, has extended Pennsylvania sand production of the Chickasha field ¾-mile north on the west flank. With casing set to 5515 feet, perforations were made at 4863-5233 feet. Well flowed an estimated 50,000,000 cubic feet of gas daily and was shut in for connections.

Garvin County: Ohio Oil Company is drilling below surface pipe at its relief well for Burns 1, SE NE SW 17-3n-2e which is out of control and yielding an estimated 75,000,000 cubic feet of dry gas daily from Pennsylvania sand at 2876 feet. Surface pipe at the relief well was set at 715 feet. The company planned to drill 1500 feet and then direction the hole to the discovery.

Pottawatomie County: Producing from the Wilcox sand, Charles E. Balph's Pool 1, NE NE NE 6-9n-4e, is a pool opener two miles east of Tecumseh Lake pool, which also produces from the Wilcox. When plug was drilled to sand at 5225-32 feet, the well swabbed 30 barrels of 39.5-gravity oil and 52 barrels of water in 3 hours. Squeeze job is being run to shut off water.

Osage County: Champlin Refining Company's Osage 1, SW SE NE 23-23n-3e, may prove a western extension of the East Watchorn pool with Wilcox sand production. Oil and water showed when plug was drilled but in disappointing proportions.

Kansas

Rooks County Pool Opened; Zenith-Peace Creek Closed

Standard Oil Company of Ohio has extended its operations into Kansas and with its first well carried in the company's name has opened a pool in Rooks County. Discovery is Moore 1, C SE NW 10-7s-17w, which had 5 feet of good saturation in Lansing lime at 2951 feet. Testing is under way with total depth at 3051 feet.

Reno County: Zenith and Peace Creek were given two link wells this week by operations of Skelly Oil Company and Magnolia Petroleum Company. Skelly's Johnson 2, C NW NE 6-24s-10w, extended the Zenith pool toward Peace Creek with Viola pay at 3690 feet. Well filled and flowed oil from porous section but no production test was made. Tubing is being run with total depth at 3726 feet. Magnolia's Jean Johnson 1, SW NE SW 32-23s-10w, midway between Zenith and Peace Creek production, found Viola lime at 3653 feet and set pipe at 3674 feet. After acid was applied, the well made 5 barrels of oil hourly, with strong gas pressure. Testing continues and the hole may be deepened.

Russell County: Lauch & Moncrief have given Foret Hill pool a southeast extension with Klusner 1, C N½ NW SW 28-15s-12w, in which Arbuckle lime pay was found productive. Given 1500 gallons of acid, the well pumped 453 barrels of oil and no water. Total depth is 3303 feet.

Pratt County: Mid-Continent Petroleum Corporation's Louis Knop 1, SW SE NE 25-26s-13w, in the North Iuka area, ½-mile from production, encountered Arbuckle good for a potential of 3000 barrels of oil. Lime was topped at 4290 feet and oil showed at 4309 feet. It was treated with 2000 gallons of acid. Total depth is 4318 feet.

Illinois

New Oil Pool Opened In Hamilton County

Gussman's Mead 1, SE SE NW 23-5s-6e, Hamilton County, 1½ miles northeast of the Hoodville pool, flowed 38 barrels of oil in 2 hours after plug was drilled to McClosky lime at 3207-22 feet, and then went dead. After the swab was run once, it began flowing again. Before casing was set 2500 feet of oil was recovered from the pay zone on a 30-minute drill-stem test. Mead 1 is the county's first successful wildcat in several months.

Seaboard Oil Company's Eldridge Community 1, NE SE NE 3-4s-3e, more than 1 mile southwest of the King pool, recovered 60 feet of oil and 60 feet of oily mud on an hour's drill-stem test of Rosiclare at 2889-2907 feet. The only productive horizons in the King pool are the Aux Vases sand and McClosky lime, although some observers regard Eldridge 1 as a possible extension of that field.

Byers and Ellison's Jefferson Oil & Gas Company 1, NE SE NE 32-3s-2e, a pool opening well ½ mile northeast of Waltonville, pumped 65 barrels of oil in 30 hours. It also was making about 3 barrels of water an hour and the operators were continuing to test.

Clinton County: Harmon's Reed 2, C SW NW 1-2n-2w, east outpost to Devonian production in the Boulder field, was pumping 18 barrels of fluid an hour of which 10 percent was salt water. The test topped Devonian at 2698 feet, about 80 feet lower than the formation is found in other parts of the pool. Saturation is at 2765-81 feet and total depth is 2782 feet.

Clay County: Myers' Hendy 1, SW SW NE 24-3n-5e, a wildcat, recovered a small show of oil in Aux Vases sand at 2809-51 feet but on a drill-stem test only 45 feet of drilling mud and a rainbow of oil were recovered. It was drilling at 2855 feet.

Fayette County: Mid-Continent Oil Company's Meyer 1, C NE NW 29-5n-3e, a wildcat northeast of the St. Paul field, was abandoned at 2178 feet with the McClosky topped at 2159 feet and the St. Louis lime at 2176 feet.

Kentucky

McLean County: George S. Engle's Brown 1, wildcat 1½ miles south of Livermore, is a new cable tool start.

Henderson County: Creekmore-Rooney-Al Walker's Priest 1, 16-P-26, Shell Oil Company farm-out wildcat 3½ miles southeast of Spottsville, is moving in rotary tools.

Edmondson County: William Ross' Kentucky Rock Asphalt Company 1 is a new wildcat location 15 miles southeast of Litchfield.

West Texas

Two Ellenburger Strikes In Winkler Completing

Pipe has been set for completion of Winkler County's two Ellenburger oil discoveries. Magnolia Petroleum Company's Walton-State 20, C NW NW PSL 4, Block B-3, encountered only 180-foot section of prolific gas-distillate pay in entering oil-saturated dolomite at 10,640 feet, and at 10,652 feet this zone flowed at rate of 132 barrels of 43.3-gravity oil with gas-oil ratio of 1710/1 during last 15 minutes of 34-minute drill-stem test. Hole was deepened to 10,744 feet, where 4¾-inch pipe is cemented on bottom, without further test. This wildcat entered Ellenburger at 10,460 feet with elevation of 2934 feet, and will be completed through perforations.

Amon G. Carter's Walton-Pure 2-C, 3½ miles east of the above record-depth producer for the Permian Basin, logged additional oil pay in deepening to 9660 feet, and 7-inch pipe was cemented at 9550 feet. This deep pay strike for the Keystone structure flowed at rate of 81 barrels of 43-gravity oil per hour, based on three 10-minute gauges, when tester was used at 9565-9600 feet. Gas volume reached a peak rate of 4,900,000 feet daily during the test. Carter's well logged 307 feet of prolific gas-distillate pay section before entering Ellenburger oil pay at 9524 feet with elevation of 2955 feet. The distillate yielded only .092 percent sulphur content, and the gasoline was rated 52.2 octane, according to analysis.

Development of the two areas, which may eventually be linked as a single structure with sharp west dip, will be speeded up in order to take advantage of the bonus allowable. Sid W. Richardson et al are credited with having authorized 2 offsets to the Keystone field strike, while Magnolia Petroleum Company is to start a second well on its large lease block. Completed wells in the Keystone area are expected to cost about $125,000. Stanolind Oil & Gas Company and Phillips Petroleum Company have paid steep prices for scattered leases within and near the Keystone sector.

Stanolind Oil & Gas Company and Shell Oil Company's Blue 1, east edge of Winkler County, was drilling at 9965 feet in Simpson, topped at 9780 feet,

being 1452 feet and 156 feet low, respectively, to the above Ellenburger strikes on this marker.

Andrews County: Skelly Oil Company's University 1-F, 2¼ miles east by north of the Emma pool, resumed coring on 7500-foot depth contract after indicating probable production from the Holt zone. Drill-stem test at 5455-5550 feet yielded 62 feet of oil-cut mud and 91 feet of oil with slight mud contamination, justifying further test after fulfilling contract.

Crockett County: Moore Bros. and Sohio Producing Company's Todd-Amerada 1, 5 miles west of Gronoidal production, is scheduled to reperforate after testing water from Crinoidal at 6812-65 feet, in saturation passed up in exploring Ellenburger at 7645-7903 feet.

Pecos County: Standard Oil Company of Texas' Douglas 1, southwest edge of Yates field, was drilling at 7180 feet, having entered Pennsylvanian at 6350 feet. No shows have been recorded below regular Permian. McCandless et al's University 1, 7 miles south of Apco field, was drilling at 5410 feet with unusually thick section of granite-wash, topped at 4850 feet. Phillips Petroleum Company's Price 1, deepest active test in the Basin, was drilling sandy-shale at 10,485 feet.

BERT M. BRUSH, Carter Oil Company scout at Mt. Pleasant, Michigan, has been transferred to the company's geological department at Cut Bank, Montana. He was succeeded by Floyd Galloway, who formerly was employed in the company's production department at St. Elmo, Illinois.

8 Tested methods for conserving brake linings
1. Before drill pipe is run in, be sure water is on water-cooled rims.
2. Reverse bands for 40% greater life. This is possible if live and anchored ends are interchangeable and when anchored end is half-worn.
3. Use segmental form lining to simplify application . . . permit release of worn particles . . . and increase heat dissipation.
4. Before applying lining, stone or smooth rough rims.
5. Never use clay, oil or other foreign materials to control friction. Early lining replacement is often made necessary by gummed brake surfaces.
6. Check adjustment of brakes and clutches often. This will prevent unequal wear, and inefficient, noisy operation.
7. Keep bands in round and unkinked when relining. This assures longer life of lining by preventing localized heating and excessive high pressure areas. Also, reduces drum checking.
8. True up scored or heat-checked rims with whetstone if other equipment is not available.
START RIGS OFF RIGHT by using J-M 420 Rotary Lining. Tough . . . durable . . . assures easy load control, even feed-off and high braking efficiency. Send for brochure FM-10A. For further suggestions on conserving Friction Materials, as well as Packings, Insulations, Roofings and Refractory Cements, ask for the new J-M Manual "101 Suggested Good Operating Practices." Johns-Manville, 22 E. 40th St., New York, N.Y.
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North Texas

Shallow Wildcat Pumpers In Grayson and Wilbarger

Shallow wildcat strikes in Grayson and Wilbarger counties qualified as oil pumpers and both have been assigned offsets. Wildcat activity is expanding rapidly due to reasonable assurance of a crude-price advance, and favorable priority given such operations.

Wilbarger County: Five tests were authorized for area adjacent to Rogers Brothers Drilling Company's McCrary 1, SW NE SE H&TC 64, Block 14, which is showing for 50 to 75 barrels daily on pump from sand at 1491-99 feet. The firm made location for McCrary 2, while Christie Brothers et al authorized 4 tests. Nearby dry holes indicate a small pool. British-American Oil Producing Company's Wilkinson 1, SWc Waggoner Colony Block 103, 5¾ miles northeast of Harrold, was drilling dry dolomite at 5910 feet in Ellenburger, topped at 5871 feet. Saturated zone at 5853-69 feet yielded 150 feet of oil on drill-stem test, and will be given another test.

Grayson County: Burk Royalty Company's Gray 1, W. S. Reeves Survey, 1½ miles northwest of Pottsboro and 1½ miles west of shallow production, rated as a 50-barrel pumper from sandstone at 1377-84 feet after drilling plugs from oil string. Second test will be ¼-mile east.

Big Well: Continental Oil Company's Kaneaster 1, offsetting separate pay discoveries in Hildreth pool, Montague County, flowed 441 barrels of 41-gravity oil on 80-minute test through 2½-inch casing, thus confirming the upper pay. Production is from conglomerate at 6076-6117 feet in Bend, topped at 6025 feet.

Deep Prospects: In Young County, Anderson-Prichard Oil Corporation and Col-Tex Refining Company's Latimer 1, near C Block 17, Young County School Lands, awaiting production test with casing on top of Bend saturation at 3643-51 feet that yielded 300 feet of oil- and gas-cut mud on drill-stem test. In Archer County, Bobby Burns et al's Wilson 1-A, 6 miles northwest of Archer City, landed 7-inch at 4975 feet to perforate promising saturation in Bend at 4847-70 feet. Frank Buttram et al contracted to drill a 6500-foot, or Ellenburger test, 3½ miles to the west of latter in paying $15 per acre bonus for 1124 acres. Location will be C NE NE ATNCL Section 104.

JOHN McFAYDEN, 72, with The Ohio Oil Company 47 years, died April 26 at his home in Beverly Hills, California. A Canadian, he joined the company in 1894 as a pumper in Ohio, and in 1905 was district foreman at Findlay. In 1912 he transferred to Wyoming as superintendent at Salt Creek, and became manager of the Rocky Mountain division, which after 1927 included California. He was a director of The Ohio Oil Company, and vice president of Mountain Fuel Supply Company and Rocky Mountain Gas Company. He retired in 1941.

S. ROBISHAW, Houston, inventor of a number of important oil field tools, died April 28. He was 58.

East Texas

Franklin County Strike Second in April

The second oil discovery for the East Texas district during April materialized when the southeastern Franklin County prospect of Tide Water Associated Oil Company and Seaboard Oil Company, Bacon 1, Block 12, John Maximillian Survey, New Hope community, averaged 12¾ barrels of 47-gravity oil hourly on 6-hour test through 5/32-inch with gas-oil ratio of 575/1. Production is from 3 zones, aggregating 30 feet of oil sand, in Travis Peak topped at 7902 feet, elevation 435 feet. Five-inch pipe is set at 7900 feet, and bottom is in dry siltstone at 8089 feet. This strike is 8 miles northwest of Travis Peak production in Pittsburg pool, Camp County. The partnership holds long-term lease on an almost solid block of 6000 surrounding acres.

L. A. Grelling et al's Stanley 1, W. B. Jordan Survey and in Southwestern Franklin County, was drilling at 5910 feet, having entered Georgetown at 5005 feet with elevation of 521 feet. Allowing for regional dip, it correlates high to Myers et al's recent 6110-foot Paluxy failure in J. M. Gill Survey.

Wood County: Magnolia Petroleum Company's Bailey-Howle 1 has been authorized as south offset to Bobby Manziel et al's Bailey-Shell 1, recent Paluxy discovery for the Cartwright area and 4¾ miles northeast of Quitman field, and the former has an east offset pending. The Manziel strike flowed 247½ barrels of 36-gravity oil initial on ¼-inch choke, gas-oil ratio 176/1, with flowing pressure on tubing and casing of 175 and 170 pounds. Production is from perforations at 6244-6319 feet, with the well bottomed at 6361 feet. Electrical log indicated main pay at 6261-74 feet. Sohio Producing Company has contracted to finance the drilling of Murray Sells, Bert Fields et al's Morgan 1, Harvey Hall Survey, scheduled Paluxy wildcat project on a strike to the southwest of the Coke field, in return for 800 acres out of the block. In the event of production the independents will be carried for an overriding royalty on the 40-acre drill site. Amerada Petroleum Corporation's Turner 1, east edge of Coke field, is nearing Travis Peak objective without shows in drilling lime at 8426 feet.

Alba Prospect: B. B. Orr et al's Rainwater 1, situated on 8-acre lease on north edge of Alba townsite, has spudded on Paluxy objective, thus taking initiative away from majors in giving this outstanding Woodbine high a deep test. Amerada Petroleum Corporation has been unitizing its acreage since the first of the year. Shell Oil Company is among largest lease owners.

Quitman Field: Amerada Petroleum Corporation, Gulf Oil Corporation et al's White 1, southeast edge of production, appeared to be first failure in yielding only 12 barrels of fluid, consisting of 90 percent 25-gravity oil and bs, with remainder salt water, on 13-hour swabbing test through perforations at 6355-58 feet. Further swabbing recovered all water. White 1 recorded structural dip in logging top of Georgetown at 5150 feet and Paluxy sand at 6320 feet with elevation of 444 feet. Electrical survey indicated water in top of the sand. This apparent failure was preceded by 11 flowing producers, including a mile northeast extension.

Limestone County: Bert F. Weekley et al's Strother 1-A, north offset to the single oil producer in Barron pool, failed to make a commercial oil producer from Upper Glen Rose, and was preparing to perforate Pettit oil saturation at 5684-5742 feet with 5½-inch at 5761 feet. Weekley et al's Barron 2-A, discovery oil well, increased its flow to 39 barrels oil, plus 41 percent water, daily on ¼-inch choke after reacidizing with 7000 gallons at 5686-5785 feet.

FREDERICK H. BOSWORTH, buyer for Standard Oil Company (Indiana), has retired after working for the company nearly 50 years.

Southwest Texas

Field Flank Areas Hold Major Interest

Outpost operations and wildcat tests held major interest last week with major interest centered on the development of leases on flanks of fields. Karnes County, an area that has been drawing more attention in recent months than any other county, is getting another Pettus-sand field with operators making a successful drill-stem test on a wildcat. Starr County, another active area, also has a new field and a new sand.

Karnes County: Transwestern Oil Company is opening a new field in the Porter area in the Pettus sand with a successful drill-stem test being run on

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Sellers 1, seven miles southeast of Runge, in the southeastern portion of the county, recovered 200 feet of high-gravity oil on a drill-stem test of perforations at 4120-24 feet, showing 1500 pounds bottom hole flowing pressure, 1560 pounds pressure shut in. The test was made in the bottom part of the Pettus sand. Side-wall samples taken at 4109-18 feet in top portion of the sand showed gas. Tests also were made in the top and bottom parts of the Carrizo and in the Wilcox, all of which showed salt water. Total depth is 8015 feet with 5½-inch casing set to 4194 feet.

Starr County: A new field is being opened by Baldridge & King eight miles northeast of Rio Grande City where Edgerton 1 is flowing oil from a shallow sand at 1222-38 feet, with some producers estimating the well good for 250 barrels of oil per day. Total depth of the hole is 4510 feet. Location is four miles east of Los Olmos field and three miles south of Lockhart & Davenport's recent discovery.

Sun Oil Company is making a flow test on Montalvo 1-B, new deep pay opener one mile west of deep production at North Sun, Starr County. The hole is bottomed at 8064 feet with 5½-inch casing set to 5994 feet. Perforations were made at 5934-50 feet.

San Patricio County: Kilgore Developers have set production pipe to 4230 feet to make test in Dix 1, wildcat in Juan de la Garza survey, six miles east of Mathis. Hole was drilled to 5653 feet on a proposed 6000-foot Vicksburg sand test. Electrical log was run before pipe was cemented.

John T. O'Neil's Welder 1, two miles southwest of Odem field in Tares and Villareal survey is at 7123 feet with 5½-inch casing set to 6887 feet. Two previous perforation jobs yielded oil and salt water, possibly through faulty cement jobs. Sand was logged at 6396-6412 feet and another sand at 6829-46 feet which showed distillate.

Texas Gulf Coast

Distillate at Sugar Valley; Drilling on Increase

A new gas-distillate field and possibly oil production has been opened in the Sugar Valley area of Matagorda County. The prospect long had been regarded as favorable to production although all previous tests have been dry. Operators are now drilling deeper in the discovery in attempt to establish other zones to production.

The number of new locations on the coastal belt also is showing a large increase. The majority of the new developments is on the edge of older fields, although several wildcats have been projected and more are due to be staked soon.

Matagorda County: Superior Oil Company is drilling deeper in Peterson 1, gas-distillate discovery in Sugar Valley area, after the well flowed 17 barrels of distillate in 8 hours with 3,150,000 cubic feet of gas through ¾-inch top choke. The test was made around 10,590 feet, although the hole is bottomed at 10,717 feet. This discovery is in the A. S. Sojourner survey.

Continental Oil Company has completed a gasser in the Citrus Grove area of Matagorda County, the first development in this sector in several months. The well is Anderson 1, E. L. Holmes survey, and it flowed 50,000,000 cubic feet of gas per day on open flow. Perforations were made at 3980-90 feet after setting casing around 4150 feet.

Waller County: Operations are reaching a new peak in the Katy area with more wells projected. Major interest is centered on developments around Stanolind Oil & Gas Company's Pattison 1 oil discovery on the north side of the field. Ohio Oil Company has staked Smock 1, a northwest offset to the well. The location is in H&TC 93, block 1. Projected depth is 7800 feet. Sinclair Prairie Oil Company has staked Walpitz 1 in J. M. Bennett survey 283. It is on a 125-acre tract in Section 98, with operations due to start soon.

Wildcats: John G. Mayo, Kirby Petroleum and Wynn Crosby Drilling Company have spotted a deep test, Jackson 1, on a Gulf Oil Corporation farmout in J. S. Roberts survey of Chambers County. Houston Oil Company and American Republics Corporation have spotted a Wilcox wildcat three miles northwest of Bessmay in Jasper County, Fee 1 in J. S. Conn survey. It will start drilling by May 1. O. C. Garvey et al have spotted a 8500-foot Wilcox test in the J. M. de la Garza grant of San Jacinto County. It is Foster 1 and is on a 160-acre tract. Tide Water Associated Oil Company, Cities Service Oil Company, Stanolind Oil & Gas Company and Arkansas Fuel Oil Company are supporting the test.

South Louisiana

Pine Prairie Flank Has Wilcox Production

One of the outstanding developments in the coastal belt this year is the opening of Wilcox production on the west flank of the expanding Pine Prairie dome in Evangeline Parish. Thus, with completion of the semi-wildcat the field has four sands and is rapidly being proved as a major rather than an average oil reserve. First production was opened in Cockfield, and later Sparta proved prolific in two sections. With the Wilcox paying off, drilling is due to show an increase around the edges of the big dome. Other developments of the week include a second location in the new Baer field and the testing of a wildcat in Acadia Parish.

Evangeline Parish: Roy Lee, Tr. (H. L. Hunt) has completed Crowell-Spencer 1 on west flank of Pine Prairie for 110 barrels of 38-gravity oil daily through ⅛-inch choke. Perforations were made at 10,519-39 feet in Wilcox after drilling to 10605 feet and setting pipe near bottom. With Wilcox topped at 10,065 feet and an elevation of 90 feet, the operator is reported to have found at least five other sections inside the Wilcox that indicated production although they have not been tested. The well is located in Section 35-3s-1w.

Beauregard Parish: Phillips Petroleum Company has entered the Baer field and staked location for First National Bank of Beaumont 1, C NE NW 27-6s-9n, east offset to General Crude Oil Company's Baldwin 1 discovery. The discovery well produces from the Frio.

Acadia Parish: Sun Oil Company is

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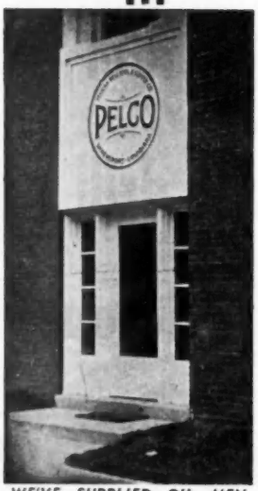

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making flow test on Daily 1, apparent wildcat discovery in the Egan area, Section 31-9s-1w. Perforations were made at 10,610-25 feet with 50 shots. The hole was drilled to 11,139 feet and 7-inch casing set to 10,871 feet. Although details have not been released, the well is reported to have found sufficient sands to indicate a new field.

Terrebonne Parish: Superior Oil Company has completed a second producer in Lake DeCade field with LaTerre Land 3, Section 27-19s-15e, flowing 96 barrels of 36.2-gravity oil daily on 6/64-inch choke from perforations at 10,202-08 feet. The discovery well was completed in August, 1942, for 454 barrels daily while the second well, Section 28-19s-15e, was abandoned at 13,075 feet in December, 1942.

Cameron Parish: Continental Oil Company is reported preparing to make location for a possible 11,000-foot wildcat in the Big Lake area, S½ 18-12s-8w. The well reportedly will be on a Union Sulphur Company farmout on the south side of the prospect. Continental also is reported to have made a deal for development in the West Mermentau area of Jeff Davis Parish, although details have not been announced.

North Louisiana

Tensas Parish Wildcat Testing Wilcox Showing

The California Company and Carter Oil Company's Rhodes 2, NW 28-9n-10e, Tensas Parish wildcat two miles northwest of Lake St. John production, topped Wilcox at 3370 feet and set pipe to 4486 feet to test Wilcox shows encountered at 3631 feet and 4570-4600 feet. During one-hour test with packer at 4428 feet and perforations at 4435-42 feet, 5 barrels of fluid, mostly salt water and scum oil was recovered. Perforations were squeezed and packer moved to 4415 feet and the same section reperforated. A twenty-hour test with ¼-inch top and bottom chokes open averaged 9 barrels of oil and 1 barrel of gas-cut mud per hour for the first 5 hours of test. During the last 15 hours flow gradually turned to 20-percent salt water and operators were preparing to re-squeeze perforations and had planned a retest.

At Lake St. John field in Concordia Parish, The California Company's deep wildcat, Community 1, SW 4-9n-10e, is exploring for new pay zones and is drilling below 8485 feet. Three pay zones have previously been found at Lake St. John, a 1942 discovery. The discovery well, The California Company's Pan American 1, SW 4-9n-10e, flowed 100 barrels of distillate per day from deep Eutaw horizon at 8940-55 feet with more than 2,000,000 feet of gas, before plugging back to Wilcox at 4567-71 feet and flowing 136 barrels of 44-gravity oil per day from which horizon the field has 13 wells in production. Shallow Sparta sand was found to produce at 2170-80 feet at E. C. Johnston's Brown 1, E½ 4-9n-10e, flowing 26,000,000 feet of gas per day. With no outlet for gas production at Lake St. John, Brown 1 has been closed in.

Claiborne Parish: Union Producing Company's King Unit A-1, NE 8-21n-4w, North Lisbon field, showed 19,000,000 feet of wet gas, 2990 pounds casing pressure, during flow test from Bodcaw

The OIL WEEKLY'S TRADING POST

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sand perforations in Cotton Valley zone at 7790-7816 feet. It plugged back to new depth at 7905 feet after drilling halted in Smackover lime at 11,103 feet. This north edge well is shut in pending state potential.

Bossier Parish: C. W. Beene et al's wildcat Fenet 1, NW SE NW 25-21n-14w, cored show in Nacatoch, topped at 994 feet. Operators had planned to set pipe at this test which is four miles east of the shallow Pine-Island field which produces from Annona at 1370 feet to 1805 feet. A few wells produce from the Nacatoch at Pine Island at 1022-60 feet.

Michigan

Drilling Starts Set Record for Year

Seventeen drilling permits approved for the current week established a record high for the year as a Gladwin County wildcat showed for probable commercial production and offsets to discovery wells in both the Cedar and Enterprise fields drilled the objective oil horizon dry.

Gladwin County: Sun Oil Company's State A1, E½ NE SE 19-18n-2w, Beaverton Township, logged Dundee lime at 3841 feet and drilled pay at 3896-3900 feet, bottoming for test at 3911. It showed 800 feet oil in 5 hours in 5-inch casing. Swab recovered 41 barrels the first day and 26 barrels the second, and will be given acid treatment. This wildcat is 4 miles northwest of the old South Beaverton field.

Osceola County: Sun Oil Company's Beardsly 1, S½ NW SW 27-18n-9w, east offset to the Cedar field discovery, logged Dundee at 3784 feet and water at 3795-97 feet. Test appeared to condemn a large area previously believed inside the charted closure of the field. Sun will perforate Traverse later to test that zone, before abandonment.

Missaukee County: C. L. Maguire, Inc.'s Ward 1, S½ NW SW 11-23n-5w, drilled the Dundee objective dry between 3160 and 3250 feet and shutdown for orders. It was the third failure in Enterprise field, all offsets, for the play this year. The discovery well, itself no longer being produced, now is offset on the north, west and south with dry holes.

Lake County: Oil Producers, Inc.'s Woods 1, NE SE SE 24-18n-12w, one of the year's best outpost prospects, abandoned at 4553 feet, after logging Sylvania formation at 4420 feet and picking up water.

Newaygo County: Ohio Oil Company logged Dundee lime objective at 3318 feet, sub-sea -2216 feet, and picked up blackwater from 3323 to 3330 feet at Vaughan 1, S½ NE NE 29-15n-11w, one of the year's best core prospects. Test may be drilled deeper or plugged back to produce Traverse lime at 2805-15 feet. Well has been flowing an average of 29 barrels per day through open 6-inch hole from the upper pay.

Mason County: C. K. Dean's Young 2, nw se nw 9-17n-15w, logged Sylvania sand at 3276 feet and is carrying 700 feet of oil from pay at 3293 feet. Fishing job currently is delaying deeper drilling. Tests drilled to same formation as early as 1927 showed Sylvania oil in the Mason district.

California

Faster Drilling Program Meets Material Shortage

California's heavy-oil development program, given fresh incentive only last week by the PAW relaxation of well-spacing, quickly ran afoul of obstruction in the form of a greater than expected shortage of material and manpower. Lack of well equipment has at last become critical. Countless items are simply "off the market."

Drilling contractors report a sharp rise in inquiries following the order relaxing well-spacing; and some of the larger ones believe the business in sight may be more than they can handle. Their trouble is inability to get crews. But the prospective contracts are conditioned in most cases upon ability of the operator to obtain casing and other materials.

The drilling outfits are operating under conditions which in normal times would be intolerable. Some of the largest contractors are using skeleton crews, and these in many cases include only aged experienced men and untrained youngsters. Efficient drilling with such personnel, at high wages and overtime, and with all costs soaring because of shortages and transportation difficulties, is simply out of the question.

Wildcatters, favored by priorities, are in a somewhat better position than operators engaged with ordinary development operations; but they too are troubled by the manpower shortage.

PAW officials are fully advised of the situation's increasing seriousness, respecting both materials and manpower. They realize relief must be found quickly to avert interference with plans to increase heavy-oil production, and they have all the war agencies involved working on the two problems.

Fresno County: Superior Oil Company's Cantua Lands 54-36, 36-17-15, Cantau Creek (Turk anticline) was abandoned at 9900 feet, reportedly in Kreyenhagen.

Kern County: Northwest of the Mount Poso field, Jergins Oil Company has started a wildcat, Lambert Lands 1, C 35-26-27. It will be a fault play for Vedder zone production.

Los Angeles County: The quest for the missing link between Santa Fe Springs and West Coyote fields again has failed, The Texas Company having announced for abandonment its 9535-foot wildcat McNally A-3, 22-3-11, La Mirada area. This is the third unsuccessful try on the McNally Ranch property.

Merced County: The Pure Oil Company and The Texas Company have launched a joint prospecting venture to test large adjoining parcels leased in the Los Banos area. It will be primarily a test for dry gas.

San Joaquin County: Amerada Petroleum Corporation's Lodi area gas test, Community 8-1, 8-4-7, failed on a test of the interval 2150-2002 fet, and abandoned at 3000 feet.

Tehama County: The Texas Company apparently has found indications warranting a thorough test of its Tuscan Springs wildcat, Walbridge 1-A, 32-28-2, a steel rig having been ordered in replacement of the portable outfit used to start the hole. Drilling will be resumed at 1498 feet.

United States Well Completions

ARKANSAS

Columbia County—Dorcheat: Carter's Kirkpatrick 1, s½ se 13-18s-22w, perf Cotton Valley 8028-38, flow 9 bbls distillate, 5 hrs, 12/64-in, 1,000,000 ft gas, 24 hrs, perf Smackover lime 8904-24, flow 3 bbls distillate, 1 hr, 10/64-in, 1,500,000 ft gas, 2550 lbs pressure, gor 13,436-1, 5½-in 8999 ft, td 9000 ft, (Smackover lime flow shut in.)

McAlester Fuel Oil Co.'s Hunt 1, 15-18s-22w, 5½-in 8932 ft, 5 bbls hr, ¼-in, td 8932 ft.

Miller County—Fouke: Carter's Philyaw 1, se se se 36-16s-27w, perf Paluxy 3636-44, flow 175 bbls, 33.5-gr, 3/16-in, tp 120, cp 165, 7-in 3682 ft, td 3702 ft.

Union County—Champanolle: W. H. Haas, Jr.'s Union 1, sw sw 20-17s-13w, temp abnd 3086 ft.

ARKANSAS SALT WATER DISPOSAL WELLS

Lafayette County — McKamie: Atlantic's Bodcaw 10, c sw 32-17s-23w, td 9400 ft.

Lafayette County — Midway: Barnsdall's Creek 2, c ne sw 10-15s-24w, td 6524 ft.

ARKANSAS WILDCAT

Calhoun County: Placid's Freeman-Smith 7, nw ne 2-15s-14w, abnd 2559 ft.

CALIFORNIA

Fresno County—Coalinga old field: Shell's 148-26, se se sw 28-19-15, pump 90 bbls, perf 2565-2595, 2730-2810, 2825-2890 ft, black shale 2548 ft, td 2930 ft.

Shell's 186-32, se ne ne 32-19-15, pump 85 bbls oil, 53 water, perf 2952-2990, 3030-3058 ft, black shale 2817 ft, td 3060 ft.

Shell's 156-34, sw nw se 24-19-15, pump 210 bbls, perf 2267-2407, 2428-2447, 2467-2655 ft, black shale 2245 ft, Kreyenhagen 2647 ft, td 2660 ft.

Standard's 55-35A, ne sw se 35-19-15, pump 32 bbls 20.5-gr, 106 ft perf, completed 3062 ft, td 3215 ft, 3178 ft.

Standard's 61-35A, sw se ne 35-19-15, pump 33 bbls 20.7-gr, 5½-in 3345 ft and completed 3321 ft, td 3350 ft.

Kern County — Belridge South: General's Belridge 16-12, ne sw nw 12-29-21, pump 40 bbls 17-gr, perf 853-958, 994-1029 ft, td 1030 ft.

Belridge Oil Co.'s 56-34, sw nw se 34-28-21, pump 60 bbls 12.9-gr, 8⅝-in 785 ft and completed 470 ft, td 785 ft.

Texas Co.'s Wrightson Fee 2, ne sw sw 12-29-21, pump 11 bbls oil, 9 water, perf 1045-1070, 1130-1140, 1160-1164 ft, oil sand 1049 ft, td 1164 ft.

Standard's 107-11D, nw sw se 11-32-24, pump 8 bbls 25.4-gr, 6-in 2800 ft and completed 273 ft, td 2811 ft.

Union's McLeod 16, nw ne se 34-31-23, pump 65 bbls 27-gr oil, 36 water, perf 3618-3576, 3556-3515, 3308-3210, 3017-2968 ft, td 3651 ft.

Kern County—Fruitvale (Well Deepened): Western Gulf's West 1, 21-29-27, pump 60 bbls 19.3-gr oil, 28 water, perf 4935-4005, 3990-3970, 3865-3855 ft, Fairhaven 3508 ft, base Etchegoin 3535 ft, Parker 3586 ft, Martin 3696 ft, Upper Kernco 3850 ft, Middle Kernco 4005 ft, Lower Kernco 4266 ft, old 3945 ft, td 4499 ft, pd 4353 ft.

Western Gulf's Red Ribbon 8, ne nw se 27-29-27, flow 700 bbls 17-gr, perf at intervals 4140-4440 ft, Fairhaven 3386 ft, base Etchegoin 3411 ft, Parker zone 3623 ft, Upper Kernco 3785 ft, Middle 3923 ft, Lower 4137 ft, old 3456 ft, td 4498 ft.

Western Gulf's Red Ribbon 15, sw sw se 27-29-27, pump 123 bbls, perf 4160-3800 ft, td 4438 ft.

Kern County — Midway-Sunset: Richfield's Fairfield 8, nw se ne 11-31-22, pump 28 bbls 17-gr oil, 46 water, 105 ft perf 1265 ft, oil sand 1157 ft, td 1285 ft.

Chanslor Canfield Midway Oil Co.'s 56-9, nw sw ne 9-32-23, pump 67 bbls 18-gr oil, 8 water, 81 ft perf 3000 ft, td 3016 ft.

H & T Oil Co.'s 9, se nw nw 15-3122, pump trace of oil, 150 bbls water, 100 ft perf 1300 ft, td 1368 ft, pd 1300 ft.

Standard's 28-31E, ne se ne 31-12-23, pump 160 bbls 27.7-gr, 21 ft perf 2220 ft and completed 2565 ft, Kinsey sand 2200 ft, td 2222 ft.

Kern County—Poso Creek-Premier: Standard's 5-17, sw se ne 5-28-27, pump 1 bbl oil, 2 water, 7-in csg 2768 ft and completed 2565 ft, perf 2745-2675 ft, td 2770 ft, pd 2669 ft.

Standard's 11-8, ne sw ne 8-23-27, pump 80 bbls oil, 55 water, 198 ft perf 2908 ft, td 2910 ft.

Kern County—Round Mountain: Honolulu Oil Corp.'s 1, se nw nw 18-28-29, pump 143 bbls 14.2-gr oil, 23 water, 6⅝-in 1890 ft and completed 1831 ft, Vedder 1838 ft, td 1892 ft.

Honolulu's E, ne nw nw 18-28-29, pump 140 bbls 14.7-gr, 6⅝-in 1770 ft and completed 1689 ft, Vedder 1709 ft, td 1771 ft.

Orange County—Yorba Linda: Shell's Olinda Four 6-15, 1771 ft n 349 ft e c/ls Citrus & Eureka Aves, 15-3-9, pump 134 bbls 13.9-gr, 183 ft perf 1728 ft, base Conglomerate 1437 ft, top first sand 1503 ft, td 1840 ft, pd 1730 ft.

Sacramento County—Rio Vista: Amerada's S. & S.J.D.D. 3, 19-4-3, dry gas, no est, td 4363 ft.

Santa Barbara County—Santa Maria Valley: Union's Union Sugar 18, lot 106 Rancho Guadalupe, 15-10-35, pump 112 bbls 17-gr oil, 6 bbls water, 209 ft perf 5273 ft, Miocene 5093 ft, td 4275 ft.

Ventura County—Timber Canyon area (Well Deepened): A. T. Dennison's 1, nw se se 13-4-21, pump 1 bbl oil, 4 water, 776 ft perf 2202 ft, soft brown shale 1230 ft, Miocene 1125 ft, old 1625 ft, td 2202 ft.

CALIFORNIA WILDCAT COMPLETIONS

Fresno County — Failure: Amerada's Cerini 56-22, sw nw se 22-17-19, Riverdale area, Templor 5600 ft, abnd 6900 ft.

Kern County — Failures: Chanslor Canfield Midway Oil Co.'s Antelope Fee 12-1, sw sw ne 12-28-19, Antelope Hills area, abnd 5001 ft.

Signal's Mills 1, se se se 24-28-28, Round Mountain area, Vedder 2220 ft, Lower Vedder 2498 ft, abnd 2524 ft.

Trico Oil & Gas Co.'s Coffee 12, ne nw nw 8-28-29, Round Mountain area, lost drill pipe, abnd 1374 ft.

San Luis Obispo County—Failure: Chanslor Canfield Midway Oil Co.'s Thomas 1, ne ne se 1-31-21, Midway-Northwest area, abnd 9188 ft.

ILLINOIS

Clay County: W. C. McBride's Berlin 2, c nw sw ne 10-3n-7e, Cypr 2600-10 ft, 13 bbls, 2610 ft.

W. C. McBride's 1, c nw nw sw 10-3n-7e, Cyp 2604-10 ft, 33 bbls, 2612 ft.

E. B. Gill et al's Keck 3, c se sw ne 35-4n-7e, Tar Springs 2329-37 ft, 10 bbls, 2341 ft.

Carter's Vangeison 1, c nw ne se 15-5n-5e, Ben 2284-2304 ft, Aux V 2331-52 ft, 148 bbls, 2352 ft.

Texas Co.'s Risser 2, c ne nw se 15-5n-5e, Aux V 2338-46 ft, 165 bbls, 2346 ft.

Tide Water's Tide Water 6, c se sw ne 15-5n-5e, Ben 2288-2313 ft, Aux V 2332-51 ft, 123 bbls, 2356 ft.

Walter Duncan's Brink 2, c se nw nw 3-5n-7e, Weller 2530-39 ft, 85 bbls, 2539 ft.

Kingwood's Lewis 4, c se sw sw 9-5n-7e, Weller 2526-38 ft, 150 bbls, 2538 ft.

Effingham County: Jarvis Bros. and Marcell Inc.'s Quast 1, c nw nw se 34-6n-5e, Aux V Ben 2289-2303 ft, Aux V 2360-74 ft, 80 bbls, 2374 ft.

Texas Co.'s Prather 3, c ne se ne 34-6n-5e, Ben 2284-94 ft, 23 bbls, 2298 ft.

Fayette County: Carter's Orville Mills 28-3, c nw 28-8n-3e, gas input well, 1492 ft.

Carter's Knapp 3, c se nw ne 20-8n-3e, abnd 1556 ft.

Franklin County: Seaboard's U. S. Coal & Coke 9, c ne ne ne 26-6s-4e, Aux V 3115-30 ft, 9 bbls, 3130 ft.

Hamilton County: Texas Co.'s S. Hunt 2, c se sw nw 7-6s-6e, Aux V 3162-90 ft, 34 bbls, 3194 ft.

Jefferson County: Fabick et al's Hale 1, c ne nw se 33-3s-3e, Aux V 2722-41 ft, 146 bbls, 2748 ft.

Central Pipe Line's Waters-Hopkins 1, c nw ne 27-3s-4e, McCl 3070-79 ft, 195 bbls, 3079 ft.

Richland County: Pure's J. O. Coen 38, c n½ of sec 9-3n-9e, Weller sd 2632-50 ft, 91 bbls, 2650 ft.

Pure's C. A. Bower A-3, c se se nw 25-4n-9e, Weller 2543-52 ft, 48 bbls, 2575 ft.

Pure's Betebenner 1, c nw nw ne 35-4n-9e, Weller 2543-52 ft, 9 bbls, 3020 ft.

Wabash County: Magnolia's C. Shearer 1, c ne sw ne 34-1n-13w, abnd 2760 ft.

Wayne County: Pure's Flexter 3, c nw se se 35-2n-7e, Aux V 2906-35 ft, 25 bbls, 2935 ft.

Pure's Talbert 3, c sw ne nw 17-1s-6e, Aux V 3031-48 ft, 72 bbls, 3048 ft.

N. V. Duncan's Brock 1, c sw sw sw 4-1s-7e, abnd 3164 ft.

White County: W. C. McBride's Howard 1, c sw ne ne 6-4s-14w, abnd 3217 ft.

Jarvis Bros. and Marcell's Gardner 4, c se sw nw 31-4s-11e, Penn 1434-66 ft, 35 bbls, 1466 ft.

Jarvis Bros. and Marcell's Gardner 7, c ne se nw 31-4s-11e, Penn 1456-78 ft, 7 bbls, 1478 ft.

Superior's Ford 19, c ne nw sw 4-5s-14w, Ben 2715-30 ft, 95 bbls, 2730 ft.

Washington County: C. V. Richardson and R. L. Rea's Niemeier 1, c sw sw nw 14-1s-1w, abnd 1555 ft.

ILLINOIS WILDCATS

Fayette County—Failure: Gulf's Capps 1, c sw ne se 31-7n-1e, abnd 1818 ft.

Gallatin County—Failure: W. C. McBride's Shan-Hise 1, c se nw se 21-8s-9e, abnd 2989 ft.

Madison County — Failure: C. G. Smith's Michael 1, c sw nw se 11-3n-6w, abnd 2548 ft.

Montgomery County—Failure: W. R. Holmes' Monke 1, c nw se nw 31-8n-5w, abnd 752 ft.

Wabash County—Failure: N. V. Duncan's

Wells Completed in the United States in Week Ended May 1, 1943

Data preliminary and subject to revision. Revised and more complete data on all completions shown in monthly summary of drilling, published in second issue of each month. More detailed data on wildcats published in third issue of each month.

State or District	FIELD COMPLETIONS: New Wells *Oil	Gas	†Input	Dry	Total	‡Old Wells Deepened	WILDCAT COMPLETIONS: *Oil	Gas	Dry	Total	ALL COMPLETIONS: This Week	Last Week	Cumulative: This Year	Last Year
Alabama														3
Arkansas	3		2	1	6				1	1	7		62	74
California	21	1			22	3			5	5	30	21	456	281
Colorado													8	4
Georgia														2
Illinois	22		1	5	28				5	5	33	29	641	629
Indiana				1	1				1	1	2	4	92	125
Kansas	13			12	25		1		10	11	36	27	505	524
Kentucky	5			2	7				1	1	8	5	94	50
Louisiana	10	1		10	21		1		4	5	26	6	192	365
North Louisiana	9	1		6	16				2	2	18		85	
South Louisiana	1			4	5		1		2	3	8	6	107	
Michigan	1			2	3	1			3	3	7	6	151	224
Mississippi									1	1	1		9	53
Missouri													3	15
Montana													58	51
Nebraska														17
New Mexico	1				1				1	1	2	4	85	138
New York	12		8		20						20	20	376	410
Ohio	1	4		3	8	1					9	21	291	396
Oklahoma	10			2	12	1	2		1	3	16	23	453	558
Pennsylvania	36	4			40						40	43	882	1,293
Tennessee													1	4
Texas	42	1		14	57	2	7		25	32	91	69	1,273	2,433
E.T.Border Co.'s	1				1						1		7	
East Texas Field													2	
Rest of E. Texas	1				1		1		7	8	9	5	76	
North Texas	4			8	12	1			6	6	19	14	293	
West Central	3			2	5		1		2	3	8	9	110	
West Texas	16			1	17	1	2		1	3	21	12	294	
Panhandle	2	1			3						3	3	76	
Upper Coast	3			1	4		1		2	3	7	5	83	
Lower Coast	5			1	6				2	2	8	14	183	
Southwest	7			1	8		2		5	7	15	5	123	
South Central												2	26	
West Virginia	2	5			7						7	12	202	244
Wyoming													40	30
Total U. S.	179	16	11	52	258	8	11		58	69	335	290	5,874	7,923

*Includes distillate wells. † Includes salt water disposal wells.

Wirth 1, c nw sw nw 23-2s-14w, abnd 3063 ft.

INDIANA

Posey County: Hollandsworth & Travis' Egli 2-A, se ne sw 19-6s-12w, abnd 310 ft.

INDIANA WILDCATS

White County—Failure: C. L. Maguire's Clark 1, nw nw nw 35-28n-4w, abnd 603 ft.

KANSAS

Barton County—Kraft-Prusa: Gulf's Zorn 1, c nw sw 31-16s-11w, Arb 3360 ft, abnd 3400 ft.

Lauck & Moncrief's Oeser 3, ne ne se 25-16s-12w, Topeka 2890-98 ft, 3500 gals acid, pump 335 bbls, 3306 ft.

Butler County — Eldorado: Cities Service's Chesney 125, c se ne 21-25s-5e, Marmaton 2190 ft, shot 40 qts, pump 50 bbls oil, 10 wtr, 2215 ft.

Butler County—Kramer: J. J. Lynn's Vandenburg 3, sw nw se 34-27s-6e, KC 2115 ft, abnd 2183 ft.

Butler County — Dunns Mill: Deep Rock's Fox 1, c e½ sw nw 32-29s-4e, Arb 3015 ft, abnd 3077 ft.

Cowley County—Unnamed: Grallop's Plover 1, c se se 8-31s-7e, KC 2010 ft, abnd 2105 ft.

Ellis County — Bemis: Earl Wakefield's Dreiling 2, c e½ se ne 34-11s-17w, Arb 3459 ft, 10,000 gals acid, 1340 bbls, 3468 ft.

Cities Service's Hall J-2, nw nw nw 35-11s-17w, Arb 3608 ft, abnd 3638 ft.

Ellis County — Sugar Loaf: Derby et al's Staab 1, ne ne ne 19-13s-17w, conglomerate 3676 ft, abnd 3720 ft.

Ellsworth County—Stoltenberg: Lario O&G Co.'s Kootz 1, c sw nw 7-17s-9w, Arb 3283 ft, abnd 3300 ft.

Greenwood County — Quincy: Becker & Stewart's Dinius 2, c w½ nw sw 31-24s-13e, Bartles 1606 ft, shot 100 qts, pump 25 bbls, 1689 ft.

Marion County—Lost Springs: Nelson Drlg. Co.'s Deines 1, c nw ne 9-17s-4e, Miss 2332 ft, abnd 2363 ft.

Ring-Mac's Henke 4, c w½ se ne 4-18s-4e, Miss 2370 ft, abnd 2434 ft.

McPherson County — Lindsborg: M&L Oil Co.'s Hoaglund 2, c w sw nw 18-7s-3w, Viola 3390 ft, 3100 gals acid, pump 59 bbls, 3397½ ft.

Pratt County—Iuka: Darby Oil Co.'s Wagner 1, sw nw se 7-27s-12w, Arb 4321 ft, abnd 4354 ft.

Pratt County—Carmi: Hollow Drlg. Co.'s Brown B-2, sw se se 29-26s-12w, Arb 4262 ft, potential 3000 bbls, 4305 ft.

Rice County—Chase: C. H. Weaver's Robins 2, c ne se ne 19-19s-9w, Arb 3229 ft, 1000 gals acid, pump 408 bbls oil, 3241 ft.

Rooks County—Berry: Continental's Jelinek 1, ne nw nw 12-9s-19w, Arb 3486 ft, abnd 3588 ft.

Russell County—Hall-Gurney: Gulf's Heard 2, c nw sw 30-14s-12w, Arb 3130 ft, pump 134 bbls, 3139 ft.

Colorado Petroleum Co.'s Resley 2, nw se se 32-14s-13w, KC 2842 ft, abnd 2888 ft.

Coralena's Forrest Fink 1, c sw sw 15-14s-14w, Lans 3037 ft, 4000 gals acid, pump 426 bbls, 3075 ft.

Russell County—W. Greenvale: Magnolia's Trapp 3, se nw ne 31-14s-12w, Gorham 3105 ft, potential 3000 bbls oil, 3108 ft.

Stafford County — Sittner: Virginia Drlg. Co.'s Mueller 1, c s½ ne se 29-21s-12w, Arb 3580 ft, pump 36 bbls, 3581 ft.

Stafford County — S. Sittner: Stanolind's Teichman 1, c e½ ne se 10-22s-12w, Arb 3628 ft, 1500 gals acid, temp pot 100 bbls, 3637 ft.

Stafford County—Zenith: Derby's McNickle 3, c n½ se 1-24s-11w, cherty lime 3720 ft, 2000 gals acid, flow 3000 bbls, 3764 ft.

KANSAS WILDCATS

Dickenson County — Failure: Westgate-Greenland's 1-A Haines sec sw 23-16s-4e, Miss 2314 ft, abnd 2395 ft.

Ellis County—Failure: Cities Service's Reidel 1, c n½ ne sw 15-13s-16w, Lans 3148 ft, Arb 3495 ft, abnd 3525 ft.

Leavenworth County—Failure: Charles Miller's Moses 1, c se se 25-9s-20e, Miss 1300 ft, abnd 1492 ft.

Mitchell County — Failure: Northern Ordnance's Burr 1, c se sw 35-8s-9w, Lans 2687 ft, Miss 3308 ft, Hunton 3539 ft, Arb 3954 ft, abnd 4047 ft.

Phillips County—Failure: E. C. Harvey and Calhoun's Harvey 1, c se ne 16-5s-20w, Lans 3287 ft, KC 3507 ft, Arb 3581 ft, abnd 3595 ft.

Reno County—Failure: Herdon Drlg. Co.'s Wilkey 1, nec 34-22s-8w, Miss 3616 ft, Arb 4020 ft, abnd 4056 ft.

Rice County—Failure: Nadel & Gussman's Baldwin 1, se sw sw 19-18s-8w, Lans 2901 ft, Viola 3308 ft, Arb 3413 ft, abnd 3439 ft.

Rush County — Failure: Elbar Oil Co.'s Schneider 1, swc 31-18s-16w, Lans 3325 ft, Arb 3933 ft, abnd 3950 ft.

Russell County — Discovery: Harry Gore's Kastrup 1, nw nw nw 15-15s-12w, 10-in 715 ft, 8-in 2252 ft, Topeka 2615 ft, Lans 2942 ft, 7-in 2982 ft, 6¼-in 3021 ft, test 1⅛ bbls per hr, 8000 gals acid 2980-3027 ft, pump 203 bbls 36-gr oil and 64 wtr, 3027 ft.

Stafford County — Failures: Plains Expl. Co.'s McComb 1, c e½ nw nw 27-24s-11w, Lans 3433 ft, Misener 3837 ft, Viola 3847 ft, abnd 3891 ft.

Broderick & Gordon's Pierson 1, c n½ ne sw 20-25s-12w, Lans 3622 ft, Arb 4187 ft, abnd 4230 ft.

KENTUCKY

Daviess County: Ohio Valley Oil Co.'s O'Flynn 4, 18-N-29, Jackson 1242-54 ft, 40 bbls, 1254 ft.

Henderson County: Farm Bureau Oil's Burbank 10-A, 3-P-21, abnd 2750 ft.

Trans-Tex. Prod. Co.'s Burbank 1-B, 3-P-21, L. O'Hara 2560-66 ft, McCl 2592-96 ft, 175 bbls, 2714 ft.

Sinclair Prairie's Burbank 10, 4-P-21, Cypr 2294-2304 ft, 298 bbls, 2304 ft.

Sun's George Utley 1, 16-P-21, Tar Springs 1870-94 ft, 37 bbls, 2642 ft.

Carter's Barrett 2, 25-P-25, abnd 2470 ft.

Union County: Sun's Uniontown Unit 3, Waltersburg 1796-1817½ ft, 24 bbls, 1817½ ft.

KENTUCKY WILDCATS

Ballard County—Failure: Carl Robinson's Clark 1, 22-H-5, abnd 3064 ft.

NORTH LOUISIANA

Bossier Parish — Sligo: Triangle's Thigpen Herold C-4, sw sw 19-17n-11w, pump 36 bbls, 3190 ft.

Caddo Parish — Caddo-Pine Island: Texas Co.'s C. L. Board 59, 3-21n-16w, pb to Annona, pump 4 bbls, td 1550 ft. (Workover.)

Bagley et al's Vaughn 1, sw se nw 7-21n-14w, pump 23 bbls, 16 hrs, td 1825 ft.

Caddo Parish—Hosston: Bayou State Oil Corp.'s Chiles 1, sw ne ne 36-22n-16w, 5-in 1082 ft, pump 4 bbls, td 1089 ft.

Bayou State Oil Corp.'s Chiles 2, w½ nw nw 31-22n-16w, 4½-in 1058 ft, pump 3 bbls, td 1058 ft.

Bayou State Oil Corp.'s Caldwell 35, se sw sw, abnd 1051 ft.

Catahoula Parish — Willow Lake: Roy L. Fisher et al's Rhone 1, sw sw 6-6n-7e, abnd 5870 ft.

Claiborne Parish—Athens: Skelly-Sunray's Wallace-Griffis 1, se ne 36-20n-7w, perf Travis Peak 6390-6400 ft, 17,000,000 gas, tp 2200, rp 2474, 20 bbls distillate, 5½-in 6460 ft, td 6605 ft.

Claiborne Parish — Haynesville: Midstates' Lowe 2, sw se 5-23n-8w, perf 5434-49, flow 250 bbls, 20/64-in, cp 1000, tp 700, 5000 gals, td 5504 ft.

Midstates' Seegers 2, 3-23n-8w, 31 bbls, 24/64-in, cp 500, tp 125, 10,000 gals, td 5430 ft.

Sylvestre's Winn 2-A, sw se 26-23n-8w, flow 310 bbls, 12/64-in, perf 5504-22, 4000 gals acid, tp 490, td 5615 ft.

DeSoto Parish—Spider: Crosby's Anders 1, se se 5-11n-14w, abnd 6327 ft.

LaSalle Parish — Catahoula Lake: Carter-Phillips' Catahoula C-3, se sw 6-6n-4e, flow 152.28 bbls, 43-gr, 3/16-in, perf 4083-89 ft, gor 820-1, td 4400 ft.

Catahoula Lake A-2, sw sw 32-7n-4e, abnd 4243 ft.

LaSalle Parish — Nebo-Hemphill: Hunt's Walker 1, se sw 25-7n-3e, abnd 4252 ft.

LaSalle Parish—Trout Creek: H. W. Todd's Whatley A-2, ne se nw 19-8n-3e, abnd 3815 ft.

NORTH LOUISIANA WILDCATS

Franklin Parish—Failure: Sohio's Spiane 1, ne ne 34-12n-8e, abnd 5066 ft.

West Carroll Parish—Failure: Continental's Causey et al 1, approx se sw sw 10-20n-9e, (slim-hole test) abnd 2882 ft.

SOUTH LOUISIANA

Calcasieu Parish — Starks: W. T. Burton's Industrial 10, 1050 ft s and 1150 ft w of nec 30-9s-12w, abnd 3623 ft.

Plaquemines Parish—Venice: Tide Water's Buras Levee 21, 1238 ft n and 150 ft e of swc 27-21s-30e, abnd 4980 ft.

St. James Parish—Hester: George Echols' Realty Operators 1, 4429 ft n 18 deg 04 mins w and 660 ft s 71 deg 56 mins w of se cor sec 19-12s-17e, abnd 8792 ft.

St. Mary Parish — Bayou Sale: Humble's Wooster-Luke 1, fr sw cor sec 16 go nw'ly on sel 900 ft, th nw at ra 960 ft in 16-16s-9e, abnd 11,025 ft.

St. Mary Parish—West Cote Blanche Bay: Texas Co.'s State-West Cote Blanche 18, n 29 deg 28 mins e 26,942 ft fr USCGS Mon "NED" in bay T-15s-6e, 7-in 9060 ft, perf 8562-70 ft, flow 130 bbls, ⅛-in, td 10,188 ft.

SOUTH LOUISIANA WILDCATS

St. James Parish — Discovery: Humble's Panno & Bossetta 1, St. James (Vacherie) area, fr most e'ly cor 8, go sw 2439 ft alg sel th 831 ft nw at ra in 8-12s-16e, 7-in 10,690 ft, perf 10,763-80 ft, flow 96 bbls dist with 2,252,000 gas, 3/16-in, td 10,895 ft.

St. Mary Parish—Failure: Arkansas Fuel's Shadyside 1, 2907 ft sw'ly alg nw'ly line of 63 fr se cor 5-15s-10e, abnd 12,020 ft.

West Baton Rouge Parish—Failure: Amerada's Nelson 1, Beaulieu area, fr most n'ly nw cor sec 97, go e alg nel sec for 5500 ft, th 550 ft sw at ra in 97-9s-12e, sw Port Allen, abnd 10,100 ft.

MICHIGAN

Mecosta County—Fork: Belvidere Oil Co.'s Schooley 1, nw se se 3-16n-7w, Stray sand, abnd 1495 ft.

Missaukee County—Aetna-Prosper: Gordon Oil Co.'s Westveer 1, s½ nw se 26-22n-6w, Dundee pay 3826-29 ft, flow 305 bbls 21 hrs, td 3830 ft.

Missaukee County—Enterprise: C. L. Maguire, Inc.'s Ward 1, nw sw 11-23n-5w, Dundee 3160 ft, abnd 3250 ft.

MICHIGAN WILDCATS

Lake County—Failure: Oil Producers, Inc.'s Woods 1, ne se se 24-18n-12w, elev 1064 ft, Dundee 3372 ft, Sylvania 4420 ft, abnd 4553 ft.

Ottawa County — Failure: Perry, Gould & Cross' Ver Hage 1, se ne se 15-5n-14w, Traverse 1644 ft, abnd 1695 ft.

Van Buren County — Failure: Harris Oil Co.'s Stewart 1, sw ne ne 7-2s-16w, Traverse 1020 ft, abnd 1031 ft.

MICHIGAN WELL DRILLED DEEPER

Osceola County—Evart: Sun's Snyder-Gruber 1, n½ sw sw 27-18n-8w, otd 3772 ft, abnd 4023 ft.

MISSISSIPPI WILDCAT

Simpson County—Failure: Gulf's Wilbe 4, ne ne 8-2n-4e, abnd 9500 ft.

NEW MEXICO

Eddy County: Danciger O&R, Inc.'s Turner 11-B, c se ne 20-17s-31e, flow 96 bbls 2-in, acid 3000 gals 3482-3506 ft.

NEW MEXICO WILDCAT

Eddy County—Failure: W. R. Mackenzie et al's Yates 1, 1980 ft nsl and 540 ft ewl 18-20s-29e, abnd 1040 ft.

OKLAHOMA

Creek County—Hickory Grove: Sun's Fry 1, se se nw 10-14n-7e, Prue 2733 ft, shot 40 qts, flow 100 bbls, 3375 ft.

Marshall County—Isom Springs: G. Snell's Fee 3, ne nw sw 31-7s-6e, abnd 525 ft.

McClain County—Byars: Phillips' Goddard 1, c sw ne 21-5n-3e, Viola 3514 ft, flow 156 bbls, 3524 ft.

Osage County—Burbank: Phillips' McCassey 16, ne ne nw 15-27n-5e, Burbank 2990 ft, shot 118 qts, pump 12½ bbls, 3056 ft.

Osage County — Domer: Sagamore's Osage 418, c s½ nw se 8-27n-11e, abnd 1916 ft.

Osage County—Hickory Creek: Ross O&G Co.'s Osage 14, cnl nw nw sw 14-29n-11e, sand 1044-64 ft, shot 80 qts, pump 8 bbls, 1071 ft.

Pawnee County—Skedee: E. W. Whitney's Hayes 1, c nw ne 35-22n-6e, Prue 2632 ft, shot 40 qts, pump 15 bbls, 2652 ft.

Pontotoc County—Roper: W. B. Osborn's Brydia 1, c sw sw 23-5n-5e, Viola 2483 ft, 5000 gals acid, pump 22 bbls oil, 25 wtr, 2566 ft.

Pottawatomie County—Seminole City: Mid-Continent et al's Marcy 4, c se nw 13-9n-6e, Hunton 3988 ft, 3000 gals acid, flow 35 bbls, 4018 ft.

Stephens County—West Loco: Texas Co.'s Bristow 2, sw sw ne 8-3s-5w, sd 1018-23 ft, sand 1023-26½ ft, pump 20 bbls 1026½ ft.

Stephens County—Velma: Skelly's Winana Unit 1, ne nw sw 25-1s-5w, sand 1468-88 ft and 1502-20 ft, shot 40 qts, flow 350 bbls, 1526 ft.

Skelly's Stiefel B-17, se se nw 35-1s-5w, sand 891-904 ft, pump 20 bbls 8 hrs, 904 ft.

OKLAHOMA WELL DEEPENED

Stephens County—Velma: Skelly's McClanahan 7, sw nw sw 35-1s-5w, otd 705 ft, perf 690-704 ft, pump 10 bbls, 729 ft.

OKLAHOMA WILDCATS

Noble County—Failure: Watchorn's Sheppard 1, nw se ne 27-22n-2e, Miss 4230 ft, Viola 4465 ft, Wx 4528 ft, Arb 4847 ft, abnd 4921 ft.

Osage County—Discovery: A. G. Oliphant's Osage 1, ne ne sw 20-25n-3e, Layton 2850-75 ft, flow 309 bbls, ⅜-in, 2875 ft.

Tillman County—Discovery: Kerlyn Oil Co.'s Hinson 1, ne se se 33-2s-17w, perf 2673-95 ft, 2924-35 ft, 2950-62 ft, 20 bbls oil, 6 wtr, 4818 ft.

EAST TEXAS

Wood County—Quitman: Delta Drlg. Co. et al's Blalock 2, 1980 ft nsl and center e&w lines 95.74-ac lse, S. G. Purse sur, elev 444 ft, Paluxy sand 6230 ft, water 6348 ft, flow 768 bbls, ¼-in, natural, perf 6230-6320 ft, td 6380 ft.

Cass County—Kildare: C. C. Gilger's Cass County 5, Watson sur, perf Gloyd lime 6065-70, flow 166 bbls, ¼-in, tp 825, cp 400, gor 1170-1, td 6100 ft.

EAST TEXAS WILDCATS

Anderson County—Failures: Byrd & Frost's Marsh 1, 1750 ft wel and 2435 ft snl J. E. Box sur, 5½ mi w Elkhart, elev 359 ft, Pecan 4004 ft, abnd 5505 ft.

Texas Co.'s Greenwood 2, 150 ft out sec R. R. Powers sur, 6½ mi nw Palestine, Keechi Dome, elev 382 ft, Pecan 2569-2656 ft, Austin 3370-3697 ft, Woodbine 3824-3912 ft, Georgetown 4010 ft, abnd 4033 ft.

Robertson County—Failure: Magnolia's Anderson 1, 4320 ft from nw and 660 ft from sw lines Jacob Fisher sur, 2½ mi nw Calvert, elev 337 ft, Pecan 2640-2935 ft, Austin 3878-4075 ft, Woodbine 4313 ft, Georgetown 4560 ft, Edwards 4828-5096 ft, abnd 5198 ft.

Smith County—Failure: B. F. Phillips et al's Collier 1, 660 ft out nwc 132-ac tr and John Lovett sur, 3 mi ne Starville, abnd 3000 ft.

Titus County—Failure: W. B. Hinton et al's Wilson 1, 660 ft from m/e/s and 660 ft from m/e/e lines TC 44, elev 286 ft, abnd 4742 ft.

Upshur County—Failure: Three C's O&G

Co.'s Blount 1, 1330 ft wel and 3130 ft nsl John Trimble sur, elev 438 ft, Pecan 2525 ft, Austin 3780-3870 ft, Woodbine 4062 ft, Georgetown 4601 ft, abnd 4611 ft.

Van Zandt County — Failure: Royal Pet. Corp.'s Key 1, 660 ft out sec 287-ac tr and Wm. Willis sur, 2½ mi se Wills Point, elev 506 ft, Austin 2782 ft, Woodbine 3866 ft, Georgetown 4632 ft, Goodland 5584 ft, Paluxy 5696 ft, 1st Glen Rose 6013 ft, 1st anhydrite 6505 ft, Massive 6923-7112 ft, abnd in Rodessa 7269 ft.

Wood County—Discovery: Bobby Manziel et al's Bailey-Shell 1, 745 ft from m/e/e and 463 ft from s lines 40-ac unit, or 267.6 varas from e and 781.9 varas from n lines Samuel Burch sur, 4¾ mi ne Quitman pool, elev 464 ft, Austin 3971-4080 ft, Sub-Clarksville 4080 ft, Woodbine 4490 ft, Georgetown 5095 ft, Goodland 6170-6242 ft, Paluxy series 6230 ft and sand 6261 ft, flow 247½ bbls 36-gr, ¼-in, perf 6244-6319 ft, gas-oil ratio 176/1, tp 175 lbs, cp 170 lbs, td 6361 ft.

NORTH TEXAS

Archer County: A. R. Dillard et al's Schenk 1, 330 ft snl and 990 ft wel sec 20, blk 3, Clark-Plumb sur, abnd 4141 ft.

W. E. Production Co.'s Anderson 2, 330 ft from nwc ne sec 8, Meade Pasture subdiv, abnd 1460 ft.

Clay County: Geo. W. Graham et al's Hansard 22, blk 53, Specht-McCutchen sur, abnd 1189 ft.

Wichita County—K-M-A: Grace & Grace's Roller 3, 3000 ft e and 5800 ft s of nwc HT&B 4, but in R. J. Scott sur, flow 627 bbls 20/64-in, shot 210 qts 4083-4138 ft.

Grace & Grace's Roller 4, 3400 ft e and 6950 ft s of nwc sec 4, but in R. J. Scott sur, flow 520 bbls 25/64-in, shot 210 qts 4065-4125 ft.

Wilbarger County: Phillips' Waggoner-Bates 11, H&TC 43, blk 4, pump 5 bbls, 1935-37 ft, td 1951 ft.

Young County—Murray: Standard of Texas-Hanlon & Buchanan's Donnell 3, 991 ft snl and 467 ft ewl TE&L 2371, Bend 3766 ft, Mississippi 4529 ft, flow 783 bbls, ¼-in, acid 1000 gals 4529-36 ft.

Young County: B. C. Gilmore et al's Barret 8, E. W. Sergeant sur, abnd 611 ft.

W. R. Stipe et al's Hunt-McClatchey 1, 1630 ft snl and 930 ft ewl TE&L 79, abnd 1141 ft.

R. J. Watson et al's Routon 3, TE&L 265, abnd 750 ft.

R. J. Watson et al's Routon 4, 750 ft out nec TE&L 265, abnd 750 ft.

R. J. Watson et al's Taack 4, TE&L 248, abnd 750 ft.

NORTH TEXAS WELL DEEPENED

Montague County: Continental's Hott 6, Ed. O'Conner sur, otd 1651 ft, pump 66 bbls, sand 1804-08 ft.

NORTH TEXAS WILDCATS

Archer County—Failures: Consolidated Oil Co.'s Humphrey 1-C, 417 ft ewl and 467 ft nsl E. S. Heath sur A-176, abnd 1634 ft.

W. H. Peckham et al's Richardson 1, 330 ft out m/e/ne corner 128.8-ac tr, n½ EL 1, A-687, abnd 1350 ft.

Throckmorton County—Failure: White-Duncan and Humble's White-Duncan 1, 330 ft snl and 990 ft wel blk 51, Comanche Reserve, abnd 3064 ft.

Wilbarger County—Failure: Staley Oil Co.'s Wheeler 1, 1584 ft snl and 1188 ft wel H&TC 56, blk 4, abnd 1385 ft.

Young County—Failures: Bridwell Oil Co.'s Hulse 1-A, 330 ft snl and 1167 ft ewl TE&L sec 767, abnd 2001 ft.

British-American's Roach 1-B, 467 ft nsl and 1401 ft ewl TE&L 304, elev 1220 ft, Palo Pinto 2843 ft, Bend 4489 ft, Miss 4993 ft, Ellenburger 5200 ft, abnd 5214 ft.

WEST TEXAS

Andrews County—Fullerton: Fullerton Oil Co.'s McKean-Eilers 1, c ne sw PSL 14, blk A-32, flow 1611 bbls 1-in, acid 16,000 gals 6794-7240 ft.

Andrews County—Mascho: Belfort Oil Co.'s University-Texaco 1-A, c se sw sec 14, blk 14, pump 83 bbls, shot 240 qts 4495-4612 ft.

Andrews County—North Cowden: Atlantic and Sun's Holt 2-E, c nw se T&P 8, blk 43, T-1-N, pump 85 bbls oil, 50 water, 4554-4695 ft, td 4750 ft.

Andrews County — West Fuhrman: Seaboard's Thornberry 4, 1995 ft nsl and 660 ft ewl PSL 18, blk A-42, flow 121 bbls ¼-in, acid 8000 gals 4241-4612 ft.

Superior of Cal's Lockhart-Brown 1, 560 ft out sec PSL 17, blk A-42, flow 357 bbls, ¼-in, shot 640 qts 4315-4630 ft.

Cochran County — Slaughter: Devonian et al's Duggan 25-A, 510 ft out swc lab 3, leag 55, Oldham CSL, flow 889 bbls, 2½-in, acid 12,000 gals 4970-5023 ft.

Devonian et al's Duggan 18-B, 510 ft out nwc lab 21, leag 55, Oldham CSL, flow 456 bbls, 2½-in, acid 8000 gals, 5026-64 ft.

Superior of Cal's Dean 6, 440 ft nsl and 4610 ft wel 5542-ac lse, Martin CSL, leag 57, flow 357 bbls cas, acid 17,500 gals 4925-97 ft.

Superior of Cal's Dean 9, 1573 ft nsl and 440 ft wel leag 57, Martin CSL, flow 594 bbls 2-in, acid 3500 gals 4903-73 ft.

Gaines County—Wasson: Continental's Wasson 6-52, 2310 ft ewl and 660 ft nsl PSL 52, blk AX, flow 464 bbls, acid 12,000 gals 4870-4963 ft.

Hockley County—Slaughter: Jerry C. Hawkins et al's Mallet 49-A, 580 ft out sec lab 14, leag 47, Edwards CSL, flow 491 bbls cas, acid 11,000 gals 4897-4946 ft.

Pecos County—Taylor-Link: Milton Unger et al's University 1-C, c sw nw sec 34, blk 16, abnd 1756 ft.

Scurry County—Sharon Ridge: R. J. Byrd et al's Wade 3, 330 ft nsl and 990 ft wel H&TC 141, blk 97, pump 271 bbls oil, 65 water, shot 845 qts 2240-2432 ft.

Terry County—Slaughter: Lido Pet. Co.'s Secrest-Devitt 1, 495 ft snl and 2145 ft wel sec 4, blk D-11, J. H. Gibson sur, San Andres 4220 ft, flow 997 bbls cas, acid 10,000 gals, 5007-40 ft.

Winkler County—Keystone: The Texas Co.'s Campbell 13, 555 ft out swc PSL 22, blk B-3, flow 182 bbls cas, shot 200 qts 3200-3325 ft.

Winkler County—Weiner: J. R. Sharp et al's Halley-Texaco 2, ne ne se PSL 7, blk B-11, flow 392 bbls ¼-in, shot 220 qts 3033-3123 ft.

Yoakum County—Wasson: Honolulu's Bennett 14-A-a, 660 ft wel and 440 ft nsl sec 614, flow 238 bbls, 2-in, acid 10,000 gals 5252-5317 ft, td 5324 ft.

WEST TEXAS EXTENSION

Hockley County—Slaughter: Jerry C. Hawkins et al's Mallet 57-A, nwc lab 12, leag 47, Edwards CSL, elev 3636 ft, top lime 4100 ft, solid lime 4466 ft, flow 571 bbls 32-gr 2-in, acid 18,000 gals 4910-75 ft, td in Clear Fork 6520 ft, pb to 5014 ft. Located 4010 ft ne prod on north edge field.

Reagan County—Barnhart: Amerada's University 1-R-N, c nw se sec 5, blk 48, flow 293 bbls 26/64-in, acid 4650 gals perf 9200-50 ft, td 9382 ft.

WEST TEXAS WELL DEEPENED

Upton County—McCamey: Continental's Reese 8, MK&T 3, blk 3, otd 2461 ft, pump 33 bbls, acid 1000 gals 2494-2506 ft.

WEST TEXAS WILDCAT

Lubbock County—Failure: John R. Sharp et al's Martin-Stanolind 1, c ne se HE&WT 18, blk D-6, elev 3319 ft, anhydrite 1935 ft, brown lime 3420 ft, San Andres 3730 ft, Glorietta 5290 ft, Clear Fork 5350 ft, abnd 6247 ft.

WEST CENTRAL TEXAS

Callahan County — Prichard: Anderson-Prichard Oil Corp.'s Sealy-Smith 2, 1980 ft snl and 2130 ft ewl GH&H 121, blk 2, elev 1994 ft, Gardner sand 3420 ft, Bend 3707 ft, Ellenburger 4280 ft, abnd 4315 ft.

Callahan County: Hunter & Hunter's Windham 1, 1320 ft snl and 660 ft ewl GH&H 145, blk 2, elev 1838 ft, Bend 3378 ft, Ellenburger 4046 ft, abnd 4094 ft.

Coleman County: Anzac Oil Corp.'s Morris 9-C, David Breeding sur 728, flow 2 bbls and 200,000 gas, 2184-91 ft, td 2684 ft, pb to 2192 ft.

Shackelford County: Daniels & Pardue's Davis 19, 744 ft nsl and 330 ft ewl ne ET 219, pump 83 bbls, shot 30 qts 1605-18 ft.

Daniels & Pardue's Davis 20, 1280 ft ewl and 660 ft nsl of n-116-ac e½ ET 219, pump 75 bbls, shot 30 qts 1620-28 ft.

WEST CENTRAL TEXAS NEW PAY

Jones County—South Noodle Shallow Pay: Cardinal Oil Co.-J. W. Byram's Carter 1, 467 ft out nec s½ T&P 33, blk 18, elev 1869 ft, Noodle Creek lime 2419 ft, pump 277 bbls, acid 2000 gals 2451½-53½ ft.

WEST CENTRAL TEXAS WILDCATS

Comanche County—Failure: O. L. Johnson et al's Knight 1, 1315 ft from m/n/n and 645 ft from m/e/w lines ET 38, abnd 610 ft.

Mills County—Failure: Al P. Groebl et al's Fairman 1, c se ne HT&B 13, elev 1530 ft, abnd 2525 ft.

TEXAS PANHANDLE

Hutchinson County: Phillips' Yake 7, H&TC 35, blk 47, pump 143 bbls, acid 4500 gals 2835-50 ft, td 2866 ft.

Moore County: Skelly's Height 1, H&TC 354, blk 44, pump 41 bbls, plus 203 bbls water, acid 2000 gals 3443-63 ft, td 3469 ft.

Wheeler County: Smith Bros. Ref. Co.'s Massey 1-D, c ne sw H&GN 13, blk 24, 11,447,000 gas, 98 lbs rp, lime 2175-2245 ft, td 2600 ft.

TEXAS GULF COAST

Brazoria County—Danbury: Humble's Moller 1-B, 1300 ft fr s and 330 ft fr wl S. A. Towsey sur, 5½-in 5740 ft, perf 5623-58 ft, flow 464 bbls, ¼-in, td 6000 ft.

Hardin County—Sour Lake: Earl C. Hankamer's Merchant 1, 330 ft fr sl and 330 ft fr e'ly wl 111-ac tr, Stephen Jackson sur, abnd 4185 ft.

Jefferson County—Lovell Lake: Humble's Jefferson Land Co. 33, 4366 ft s fr sw cor E. K. Failor lse, BBB&C sur, 5½-in 7708 ft, sand 7713 ft, flow 99 bbls, ⅛-in, td 7721 ft.

San Jacinto County—Mercy: Shell's Dunnam 5, 2125 ft n and 485 ft w of se cor John R. Richardson sur, sand 8281 ft, 5½-in 8281 ft,

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POSSIBLE FUTURE OIL PROVINCES of the UNITED STATES AND CANADA

A symposium conducted by the Research Committee of The American Association of Petroleum Geologists, A. I. Levorsen, chairman. Papers read at the Twenty-sixth Annual Meeting of the Association, at Houston, Texas, April 1, 1941, and reprinted from the Association Bulletin, August, 1941.

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Edited by A. I. LEVORSEN

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The purpose of this symposium is to get an over-all picture of the undiscovered oil resources of North America, north of the Rio Grande. Ten geological organizations have participated, to the end that this survey has behind it the authority of many geologists representing state and national geological surveys, large and small oil companies, and consulting and independent geologists. A map and a section of geology, stratigraphy, and structure illustrate each province description.

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flow 157 bbls, ⅛-in, open hole 8281-98 ft, td 8298 ft.

TEXAS GULF COAST EXTENSION

Galveston County—Hitchcock: Maco Stewart's Fee 1, sand 5131 ft, perf 5132-43 ft, flow 486 bbls ¼-in, td 7781 ft. Extends Miocene pay half-mile east.

TEXAS GULF COAST WILDCATS

Fort Bend County—Failure: Phillips' Robinson 1, west flank Blue Ridge dome, 293-ac tr, Duff & Robinson subdvn of Hicks Shropshire sur, abnd 5605 ft.

Wharton County—Failure: Stanolind's Hudgins 1, 2 mi nw Hungerford, 2600 ft s and 330 ft e of nw cor 125-ac tr, A. Jackson sur, slim-hole test, abnd 5650 ft.

LOWER TEXAS COAST

Jackson County — Stewart: W. Stewart Boyle's Meyer 1, 660 ft fr n&el of e 80-ac of 160-ac tr, George Sutherland sur, A-75, 7-in 5048 ft, abnd 5055 ft.

Jackson County—West Ranch: Magnolia's West Ranch 247-A, 4530 ft fr nwl 11, 582-ac lse, R. Musquez gr, sand 5726 ft, 7-in 5755 ft, perf 5748-53 ft, flow 113 bbls, 7/64-in, td 5760 ft.

Karnes County — Hobson: Seaboard's Pluezkhan 1, 500 ft fr n&wl's 114-ac tr Don Erasmo Seguin Gr, 5½-in 4040 ft, perf 4032-36 ft, flow 198 bbls, 5/32-in, td 4041 ft.

Kleberg County—Stratton: Humble's King Ranch-Paso Ancho 29, 1320 ft e King Ranch 13 on 6350-ac tr, Paso Ancho de Abano gr, 5½-in 6656 ft, perf 6645-55 ft, flow 69 bbls, ⅛-in, td 6667 ft.

Nueces County — Petronilla: Coquat and Buescher's Knight 1-C, 467 ft fr s&wl's blk 4, Roberts & White subdvn, Canutillo Colony sur, 7-in 6971 ft, perf 6970-71 ft, flow 46 bbls, 3/32-in, td 6871 ft.

Nueces County — Richard King: Southern Minerals' Richard King 4-C, 495 ft fr nl and 2449 ft fr el of sec 9, 5½-in 5580 ft, perf 5572-77 ft, flow 191 bbls, ⅛-in, td 5580 ft.

LOWER TEXAS COAST WILDCATS

Jackson County—Failure: John B. Coffee's Egg 1, 467 ft fr n&el of 258-ac tr, blk 6, R. H. Hines sur, 2 mi sw Harmon field, abnd 6511 ft.

Karnes County—Failure: Blanco Oil Co. and Al Buchanan's Nichols 1, 660 ft fr nw'ly sel&swl of 147-ac tr, Carlos Martinez gr, abnd 7750 ft.

SOUTHWEST TEXAS

Duval County—Conoco Driscoll: Continental's Robt. Driscoll, Jr., 15-B, 1950 ft fr nl and 2480 ft el J. P. Nelson sur 446, 6-in 3014 ft, perf 2903-10 ft, flow 115 bbls, ¼-in, td 3795 ft.

Duval County — Cadena: Taylor Refining Co.'s Cadena 3, 517 ft fr wl and 2200 ft fr sl of Calletano Ruos sur 304, 7-in 4660 ft, perf 4571-73 ft, flow 99 bbls, 13/64-in, td 5443 ft.

Duval County—Sejita: L. H. Wentz' Salinas 1, 535 ft fr sl and 980 ft fr el 83-ac tr, share 9, San Pedro de Charco Redondo gr, nw flank, 7-in 5795 ft, perf 5767-72 ft, flow 148 bbls, ⅛-in, td 5795 ft.

Jim Hogg County—East: Sun's East 3-D, 660 ft fr e'ly wl and 1980 ft fr s'ly sl of 4480-ac tr, Santo Domingo de Arriba gr, 5½-in 4772 ft, perf 4729-32 ft, flow 242 bbls, 5/32-in, td 4786 ft.

Jim Hogg County—Colorado: Sun's Thaxton 18, 4300 ft fr wl and 330 ft fr sl of Thaxton & Cordz sur 630, 5½-in 3082 ft, sand 3084 ft, flow 68 bbls, 3/16-in, td 3094 ft.

LaSalle County — Washburn: Quintana's South Texas Syndicate 20, 650 ft fr nl and 510 ft fr el E. M. Dull sur 86, 5-in 5537 ft, flow 324 bbls, ¼-in, td 5555 ft.

Starr County—North Sun: Sun's Guerra 2-R, 483 ft fr n&sl's and 2295 ft fr el of 151-ac lse, La Sal Colorado gr, share 3, 5½-in 4562 ft, sand 4544 ft, perf 4550-54 ft, flow 144 bbls, 9/64-in, td 4562 ft.

Webb County — Dulup: Dulup Oil Co.'s Bruni 1, 330 ft fr n&wl's blk 12, Brown subdvn, Albercas de Arriba gr, 5½-in 1885 ft, abnd 1920 ft.

SOUTHWEST TEXAS EXTENSION

Duval County—Strake: G. W. Strake's Yates Rch 2, 330 ft fr s&el 80-ac tr, J. H. Maynard sur 6, A-249, 600-ac lse, set 5½-in 3206 ft, perf 3179-92 ft, flow 315 bbls ¼-in, td 3805 ft, extends prodn se.

SOUTHWEST TEXAS WILDCATS

Duval County — Failures: Wynn Crosby's Garcia 1, East Fitzsimmons area, 1320 ft fr wl and 1980 ft fr nl AB&M 407, abnd 5015 ft.

Frank & George Krankel's Yates 1, 660 ft fr n&el of w½ E. R. Gray sur 468, 3 mi se Labbe field, abnd 3516 ft.

Jim Hogg County—Failure: W. C. McBride's Palacios 1, 330 ft fr n&wl's blk 9, sur 291, e flank Randado field, abnd 3510 ft.

LaSalle County — Discovery: Quintana's South Texas Syndicate 1-D, 6490 ft fr sl and 2010 ft fr wl 7488-ac lse, H&GN 8, 4 mi s Fowlertown, 5½-in 6104 ft, perf 6030-35 ft, flow 4,000,000 gas, 4 bbls 48-gr oil, ¼-in, td 7115 ft. Opens gas field.

Live Oak County — Failure: Simmons Oil Co.'s Briam 1, 467 ft fr nwl and 5787 ft fr nel, Dennis McGowan sur, abnd 6240 ft.

McMullen County—Failure: Humble's Dillworth 1, 4620 ft fr sl and 660 ft fr el Hugh Frazier sur 24, 3 mi sw Tilden, abnd 6775 ft.

Bossier Parish: Harry I. Morgan's Bolinger 1, lot 18, 38-23n-11w, woc.

White & Hinton's Louisiana 1, sw ne 16-23n-12w, dr.

Caddo Parish: H. C. Owens et al's Dominick 1, ne se 7-22n-14w, sd.

Caldwell Parish: T. L. Sessions et al's Louisiana 1, ne ne 27-12n-3e, dr.

Youngblood-Foree's Louisiana 1, se se 18-14n-3e, dr.

Catahoula Parish: Sinclair Prairie's State 1, nw se 30-9n-7e, mim.

Concordia Parish: California-Pan American's Community 1, sw 4-9n-10e, dr.

DeSoto Parish: Oakes-Easton et al's Ramsey 1, nw sw 27-13n-16w, dr.

Grand Cane Co.'s O'Neal 1, se nw 24-12n-15w, wo.

Grand Cane Co.'s Union 1, sw nw 22-13n-14w, dr.

Franklin Parish: C. H. Murphy, Jr.'s D. Robinson 1, sw nw 21-13n-7e, lcn.

Sohio's Splane 1, ne ne 34-12n-8e, dr.

Grant Parish: Sohio's Colfax 1, nw nw 22-8n-3w, mir.

Morehouse Parish: Sohio's Carter 1, ne se 34-19n-6e, spud.

Red River Parish: Peterson Petroleum Corp.'s Wilkinson 1, se se 11-12n-10w, wo.

Cryer & Reese' Adams 1, sw se 27-12n-9w, lcn.

Vernon Parish: W. S. Smith's Nona Mills 1, nw ne se 31-3n-11w, sd.

West Carroll Parish: Continental's Bruce 1, sw sw sw 6-20n-9e, dr.

Continental's Bruce 2, n½ ne ne 4-20n-9e, lcn.

Continental's Bruce 3, ne ne ne 2-20n-9e, lcn.

Winn Parish: Mansfield's Fee 1, sw se 8-12n-4w, dr.

MICHIGAN

Allegan County: A. W. Winchester's Abbot 1, n½ nw se 34-1n-14w, dr.

Genesee County: John F. Burton's Lyon 1, ne ne se 26-9n-8e, dr.

Missaukee County: American Drilling Co.'s Miller 1, s½ sw se 27-23n-6w, rig.

Ogemaw County: R. B. Tamblyn's Everett 1, se se nw 10-22n-4e, lcn.

Van Buren County: Harris Oil Co.'s Stewart 1, sw ne ne 7-2s-16w, dr.

OKLAHOMA

Comanche County: J. B. Russell's Wisner 1, sw nw nw 28-2s-10w, dk.

Garfield County: Watchorn O&G Co.'s Kaiser 1, ne nw 8-20n-3w, c&p.

Garvin County: Ohio's Simpson-Kelly 1, sw se nw 14-1n-1w, lcn.

Hughes County: Deep Rock's Price 1, c ne ne 29-7n-10e, spud.

Kiowa County: Kerlyn Oil Co.'s Greb 1, se sw sw 1-7n-17w, c&p.

Lincoln County: Phillips' School 1, c ne ne 16-12n-2e, rig.

Logan County: Continental's Clark 1, sw sw sw 17-16n-1w, rur.

Anderson Prichard's Morgan 1, nw nw ne 33-16n-1w, c&p.

Oklahoma County: Hall & Briscoe's Barry 1, nw nw se 35-13n-1e, lcn.

Fred Plak's Owens 1, sw se ne 30-14n-1w, spud.

W. E. Hightower's Young 1, se se ne 11-14n-4w, lcn.

Pontotoc County: Blackwell O&G Co.'s Walters 1, nw nw se 19-4n-8e, lcn.

Pottawatomie County: Stanolind's Perkins 1, sw sw sw 10-8n-3e, lcn.

Washita County: Gulf's Perkins 1, c se sw 31-8n-17w, rur.

EAST TEXAS

Cherokee County: L. O. McMillan et al's Southern Pine 1, 660 ft ewl and 2440 ft nsl 402-ac tr and Edwin Harry sur, 10 mi sw Rusk, lcn Woodbine test.

Hunt County: O. W. Killam et al's E. L. Waid 1, 330 ft out sec 102-ac lse, John House sur, lcn.

Smith County: General Crude Oil Co.'s Birdwell 1, 660 ft out nwc 233.2-ac tr and blk 2, J. G. Garrett sur, Sand Flats area, lcn.

Wood County: B. B. Orr et al's J. C. Rainwater 1, 197 ft nsl and 276 ft wel 8-ac lse and blk 33, Jason Sherman sur, ½-mi n Alba, sp.

Panola County: Continental's Werner 1, Palmer sur, dr.

Union's C. Black 1, Black sur, dr.

NORTH TEXAS

Clay County: Continental's W. Hilburn 1, 779 ft wel and 1240 ft snl 125-ac tr, E. W. East sur A-133, ¾-mi ne Shannon, lcn Ellenburger test.

Tom B. Owens and Larry Hults' Hickman 1, 660 ft out nec sec 79, Freestone CSL, lcn 6500-ft test.

Grayson County: Burk Royalty Co.'s Freeman 1, 330 ft out nwc 148-ac lse, se part W. S. Reeves sur A-1016, testing 1393 ft.

Jack County: Joe A. Worsham's T. H. Cherryhomes 1, 2310 ft n and w of sec MEP&P sur A-420, but in MEP&P sur A-423, rig 5300-ft test.

Montague County: Bridwell Oil Co.'s G. S. Gray 1, 330 ft ewl and 1700 ft snl L. Bennett sur A-50, lcn 2500-ft test.

W. B. Omohundro et al's M. Fowler 1, 5877 ft nsl and 3141 ft ewl of R. M. Davis sur A-181, lcn Ellenburger test.

United States Wildcat Starts

ARKANSAS

Ashley County: Union's Crossett B-1, s½ ne 2-19s-7w, dk.

Calhoun County: Placid's Freeman-Smith 5, nw se 14-16s-13w, dr.

Placid's Freeman-Smith 6, se sw 11-15s-14w, dr.

Placid's Freeman-Smith 8, nw ne 8-15s-14w, lcn.

Placid's Southern-International 2, sw sw 35-15s-14w, dk.

Clay County: L. L. Travis' W. C. Burns 1, sw sw 26-20n-7e, lcn.

Columbia County: McAlester - Southwood's Staggs 1, nw sw 10-16s-20w, dr.

Lafayette County: N. Hobson Wheless Co.'s C. Coleman et al 1, sw ne 30-16s-24w, lcn.

Miller County: Northern Ordnance's Adcock A-1, nw nw 1-19s-28w, dr.

Union County: J. C. Schmidt, Tr.'s Kelly 1, ne se 9-17s-14w, woc.

B. S. J. Corp.'s Jerry A-1, s½ se sw 21-17s-14w, wo.

CALIFORNIA

Kern County: E. B. Hall's 1, 17-28-20, Antelope Hills area, lcn.

Jergins Oil Co.'s Lambert Lands, 35-26-27, McVan area, rig.

Palomar Ref. Co.'s Russell 1, 6-28-29, Round Mountain area, grade.

Ventura County: Standard's Crestmont 1, 14-4-18, Piru area, grading.

ILLINOIS

Clay County: J. W. Meyers' Hendy 1, sw sw se 24-3n-5e, lcn.

Effingham County: Watkins & Hawkins' Webster 1, nw se nw 34-6n-6e, lcn.

Jefferson County: J. N. Horsh's Luchinski 1, sw sw se 23-4s-1w, drlg.

Greene County: D. S. Brooks' Valley Farms 2 nw se 30-11n-13w, dr.

Hamilton County: General Oil & Gas Syndicate's Schmoll 1, se ne sw 28-4s-7w, lcn.

Monroe County: Vawter & Braun's Dill 1, nw nw ne 13-3s-10w, lcn.

Shelby County: John J. Callahan et al's Becker 1, ne ne sw 11-9n-5e, lcn.

St. Clair County: N. W. Whitton et al's Grossman 1, nw nw ne 25-1s-9w, dr.

White County: Sun's Lutz 1, se sw nw 30-4s-14w, lcn.

INDIANA

Gibson County: Kingwood Oil Co.'s Witherspoon 1, c sw nw 19-3s-11w, dr.

Knox County: Sun's Weaver 1, nw se nw 5-5n-7w, lcn.

Morgan County: Wayne County Production Co.'s Mayow 1, c e½ se ne 34-12n-1w, lcn.

Vanderburg County: George E. Nelson's Zimmerman 1, se sw se 22-7s-11w, lcn.

KANSAS

Barton County: Vernon Alpine & Brunson's Hutchman 1, c s½ se ne 28-16s-12w, lcn.

Butler County: Branine & Goering's 1-B Joseph, se sw nw 18-25s-4e, lcn.

Cowley County: Northern Ordnance's Ramey 1, c nw sw 20-33s-8e, mi.

Ellis County: Cities Service's Scheck 1, nwc se 30-12s-16w, lcn.

McPherson County: D. J. Marshall et al's Eash 1, swc 3-20s-5w, lcn.

Osborne County: Northern Ordnance's Vandament 1, c nw nw 3-9s-13w, rur.

Lew Travis' Applegate 1, c sw sw 11-10s-12w, rig.

Russell County: Northern Ordnance's Beverly 1, c sw nw 11-11s-14w, woc 270 ft.

Northern Ordnance's Roda 1, c nw nw 3-12s-14w, lcn.

Gough Davis et al's Claussen 1, sec 27-12s-14w, lcn.

Vernon O&G Co.'s Billings-Shaffer 1, nwc ne 18-14s-13w, lcn.

Ohio et al's Strecker 1, sec sw 21-15s-14w, lcn.

KENTUCKY

Henderson County: Nash Redwine's Sigler 1, c s½ nw sw 12-O-22, lcn.

Logan County: Charles Berger's Brown 1, 21-G-31, dr.

Webster County: Sinclair Prairie's Cavanaugh 1, 12-N-23, lcn.

NORTH LOUISIANA

Bienville Parish: Placid's Southern-Advance et al's 1, sw ne 16-15n-6w, dr.

Placid's Nebo B-1, sw ne 13-15n-7w, lcn.

C. W. Beene's Fenet 1, nw se nw, wo.

Electric Gas & Oil Co.'s State 1, c w½ 8-16n-10w, dr.

WEST TEXAS

Crockett County: Moore Exploration Co.-Olson Oil Co.'s Halff 2-A, 660 ft out nec I&GN 64, blk 1, lcn 2000-ft test.

Yoakum County: Rowan Drlg. Co. et al's S. J. Dixon-Amerada 1, c ne nw sec 571, blk D, J. H. Gibson sur, lcn 5600-ft test.

WEST CENTRAL TEXAS

Jones County: F. R. Sylvester et al's Mahan 1, 467 ft out nwc 163-ac lse, G. Martinez sur 137, lcn.

Palo Pinto County: W. K. Gordon et al's Conway 1-A, 990 ft nsl and 175 ft ewl T&P 59, blk 2, lcn 3500-ft cable tool test.

Shackelford County: Geo. Kidd et al's Matthews 1, 450 ft out nec nw¼ B.A.L. sec 19, lcn 2000-ft test.

Stephens County: Ben F. Read, tr's Corbett 1, 660 ft out nwc TE&L 1092, lcn 4700-ft rotary test.

TEXAS GULF COAST

Harris County: Ludeau Oil Co.'s Ludeau 1, 9 mi n Houston, 40-ac unit, H&TC 4, blk 1, tract 63 Cragin & Parkhill subdvn, lcn 6000-ft test.

LOWER TEXAS COAST

DeWitt County: Pitkin-Goldston's Mugge 1, 660 ft out of ne cor 101-ac tr, William Quinn sur, 2 mi nw Nordheim, lcn 7800-ft Wilcox test.

Jackson County: Morris K. Womack's Sheblack 1, 660 ft fr s&wl e½ blk 12, Hahl & Woolfolk's Sudbvn, Thomas Menefee sur, lcn.

Victoria County: Arkansas Fuel's Terrell 1, Terrell area, 3341 ft fr n'ly nl and 1975 ft fr e'ly line of lse, Antonio Siedeck sur, rigging up.

SOUTHWEST TEXAS

Jim Hogg County: M. L. Massingill's East 1, 330 ft fr n&el of H&GN 29, 17 mi sw Hebbronville, lcn 4000-ft test.

LaSalle County: Quintana Petroleum's Gausemeier 1, 660 ft fr n&el of NE H&GN sur 163, 9 mi s of Los Angeles, lcn.

Live Oak County: R. P. Holland's Tullis 1, 330 ft fr n&el of 20-ac lse, blk 75, Dr. Charles F. Simmons subdvn, lcn.

Live Oak County: Simmons Oil Co.'s Briam 1-A, 467 ft fr nw and 5742 ft fr nel of Dennis McGowan sur, A-29, drilling.

Zapata County: Texas Co.'s Hartman 1, 2310 ft fr ne&sel of Samuel Hamilton sur 292, 1280-ac lse, lcn 3500-ft test.

SOUTH CENTRAL TEXAS

Travis County: Marts & Beaven's Pearson 2, 330 ft fr n&wl of 100-ac lse, Thomas Westbrooks sur, lcn.

Squeaks from the Bull Wheel

Joke's Old, Too

Traffic Officer: "As soon as I saw you around the curve I said to myself, 'Forty-five at least.'"

Woman Driver: "Well, I'll be honest with you—you're off. It's this hat that makes me look so old."

The Rebuke

"Let me tell you, my friend, that horse knows as much as I do."

"Well, don't tell anybody else; you might want to sell him some day."

Flustering the Famous

In his early touring days, Ignace Paderewski attracted considerable attention by his habit of wearing his hair extremely long.

One day a newsboy plucked at his sleeve.

"What time is it, mister?" he asked.

"Ten minutes to 3."

"At 3 o'clock," suggested the puckish urchin, "go get yourself a haircut!"

Irritated by this impudence, Paderewski recounted the incident at once to the policeman on the corner, concluding with the question:

"What shall I do about it?"

The policeman glanced at the musician's luxuriant thatch and then pulled out his watch.

"Well," he declared, "you might hurry. There's less than 8 minutes left!"

Already Planned

"Are you going to marry my sister?" asked little Laura.

"I don't really know yet," replied the man in uniform.

"Well, I do," confessed the helpful cherub, "and it's going to be a military wedding!"

Talking Horse Story

An inebriated gentleman lurched, grabbed a lamp post, swung around it three times and came to a stop face to face with a milk wagon horse.

"Drink too much?" the horse inquired casually.

The drunk stiffened, hardly believing his ears. "Did you just speak?" he inquired.

"Sure," the horse drawled, "been talking ever since I quit winning races back thirty year ago."

"Lord," the drunk mumbled to himself, "a talking horse! I can make a fortune! I'm a rich man!" . . . To the horse he said: "Tell me about yourself."

For fifteen minutes the horse gave him a complete picture of his life. The drunk was more amazed than ever. Finally the milkman appeared.

"I'll buy your horse!" the drunk roared. "I'll give you $1,000 for him. Now! On the spot!"

"Humph!" snorted the milkman mounting the wagon. "Did you fall for that stuff about him winning the Derby, too?"

Important Detail

"A man is never older than he feels. Now this morning I feel as fresh as a two-year-old."

"Horse or egg?"

William M. Barret, Inc.

Consulting Geophysicists

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Contracts accepted for domestic and foreign projects, using the most improved instrumental and interpretative technique.

GIDDENS-LANE BUILDING
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Oil Field Brines, Waters and Cores
Complete Evaluation of Crude Oils

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THE FORT WORTH LABORATORIES

Analysis of oil field brines, cores, gas, oil and minerals. Field gas testing. R. H. Fash, Vice President; Long Distance 138. 823½ Monroe Street, Fort Worth, Texas.

MAKE THAT ROPE LAST
Help the War Effort by making your rope last longer. But if you do need new rope, remember that New Bedford "TOPSALL" is made from the finest materials obtainable today. It will serve you well.
Send for a copy of "Care and Conservation of Rope." It gives many valuable suggestions.

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Mills: New Bedford, Mass. • Established in 1842
NEW BEDFORD PURE MANILA

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39th and CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA

Our courteous and competent staff will give you the utmost in friendliness, comfort and service. Conveniently located to all stations, and only five minutes away from the heart of the business section.

600 ROOMS
Each with bath from $3.00 up

RADIOS IN EVERY ROOM

Lounge and Restaurants
Unrestricted Parking to 3 a.m.

Notes for the Equipment Buyer and User

Reinforced V-Belt

B. F. GOODRICH COMPANY

B. F. Goodrich Company, Akron, Ohio, announces production of a new wire-reinforced V-belt. Two types are being made: a cable cord construction and a grommet construction which incorporates a wire cord placed in the center of a cotton or rayon grommet.

The company emphasizes that only after full engineering details of equipment on which the belt may be used, and operating conditions are studied, will it be able to decide whether a wire belt will be practical.

Workover Rig

THE PARKERSBURG RIG & REEL COMPANY

The Parkersburg Rig & Reel Company, Parkersburg, West Virginia, announces the O.C.S. chain-driven workover rig which it is said offers advantages that have heretofore been available only in steam-driven rigs.

The drilling drum has four speeds and is capable of maximum single-line pull at stalling speed of from 18,500 pounds to 65,300 pounds. Spooling capacity ranges from 11,500 feet of ½-inch line to 3700 feet of 1-inch line and bare drum line speeds run from 78 to 560 feet per minute. The spudder arm can be changed to give either a 34- or 44-inch stroke.

The sand reel has two speeds, with bare drum line speeds of 148 to 872 feet per minute and a maximum single-line pull at stalling speed of 12,250 to 27,000 pounds.

With the twin-disc torque converter both line speed and pull can be automatically increased as much as 5:1 without changing ratios. In changing speeds on the hoist drum it is not necessary to shut down. The operator merely throws one friction clutch out and another one in.

The spudder arm also has two speeds and, depending on engine speed, will operate from 6 strokes per minute.

The workover rig was designed for ruggedness as well as flexibility. It is simply designed, sturdily built and is said to have an unusually low center of weight that makes for smoother operation and great stability.

Tulsa Exposition Plant Leased to Douglas Aircraft

Grounds, building and facilities of International Petroleum Exposition, Tulsa, have been leased to Douglas Aircraft Corporation.

Kerotest Gets Gold M Award for Production

Kerotest Manufacturing Company, Pittsburgh, has been awarded a gold star to the M pennant previously awarded, by the United States Maritime Commission.

Shorter Name

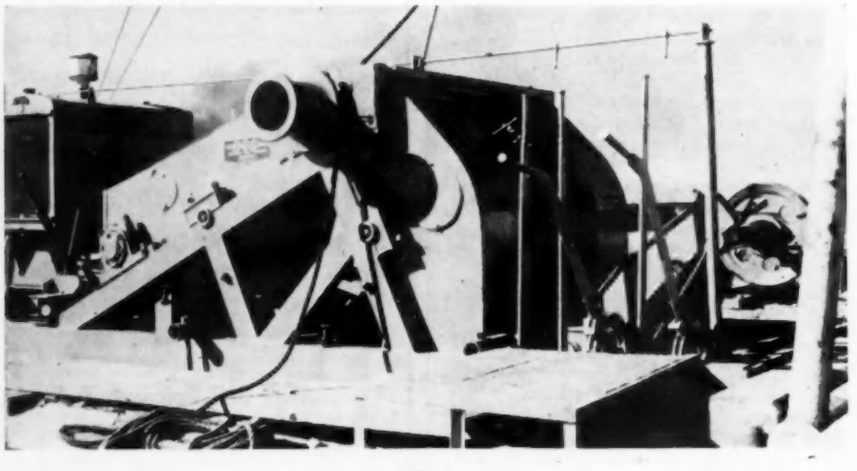
American Brake Shoe & Foundry Company, 230 Park Avenue, New York, announces that its name has been shortened by dropping "& Foundry." The new name is American Brake Shoe Company.

New Parts from Old

International Nickel Company, 67 Wall Street, New York, discusses four different methods for renewing worn metal parts such as pump rods and shafts, in a new bulletin, "How to Recondition Worn Pump Shafts and Rods." Using a worn pump shaft as a practical example, the booklet explains and illustrates the step-by-step procedures for reconditioning the shaft by machining and refinishing the worn section; by building up and refinishing the section by welding; by metal spraying; and by heavy and hard electro deposition.

Tool Shanks

The Cooper-Bessemer Corporation, Mount Vernon, Ohio, has published a new 12-page bulletin describing tool shanks. Included are specifications with accompanying photographs and list series numbers, dimensions and quantity prices for both straight and bevel-nosed tools.



O.C.S. Workover Rig

New Rating on Fittings To Save Steel

Authorization of higher pressures for steel flanges, flanged fittings, and valves used in water, steam, and oil pipe lines, by the American Standards Association is expected to further economy in the use of steel for pipe lines and thus help in the steel conservation program.

Standard pressure ratings for steel flanges and fittings were first compiled in 1927. Subsequent revisions resulted in American Standard B16e, Steel Pipe Flanges and Flanged Fittings, published in its final form in 1939. The 1943 War Standard is a further effort toward keeping the standard abreast of industrial progress and engineering development.

The new standard gives detailed information concerning calculation results and materials, and also contains four tables of pressure-temperature ratings with charts.

Copies of the standards may be obtained from American Standards Association, 29 West 39th Street, New York City.

PERSONALS

LIEUTENANT KENNETH CRAVER, former secretary-treasurer of Thornhill-Craver Company, Houston, recently completed his course of training at the Naval Air Station, Quonset Point, Rhode Island, and after a short leave, will report for permanent assignment. He enlisted in the Navy in February, and is on leave-of-absence from his company for the duration of the war.

WILLIAM W. KLEMME has been appointed district manager of industrial sales, Dallas, Texas, for Chain Belt Company. He has been connected with the company since 1935 and has been district manager at Buffalo, New York. He is a graduate in Mechanical Engineering, University of Wisconsin.

EARL DANIELS, general sales manager of Hydril Company, is on a three months tour that will carry him to Houston, New Orleans, St. Louis, Pittsburgh, Washington, New York, Toronto, Chicago, and Denver before he returns to his headquarters in Los Angeles.

S. F. BIRD, University of Oklahoma, whose subject was "Soil Analysis," and Morris Weingarten, Oklahoma A. and M., whose topic was "Ignition Lag in Compression Engines," spoke at the spring meeting of the Mid-Continent section, American Society of Mechanical Engineers. Bird was given the A.S.M.E.'s annual award for his talk which related to the location of oil and gas deposits.

A LETTER TO AN ADMIRAL

CONCERNING US

"My dear Admiral:

"It is not my intention to interfere with any plans that you may have had, and I do not know just how the different firms qualify for recognition but, if you wanted to look up:

"Dedman Foundry & Machine Company,
415 North St. Charles Street,
Houston, Texas,

and find that they are doing as good a job for their other customers as they are for us, it might be possible that you would like to have their activities rewarded.

"I thought in these times, when the steel foundries are doing so badly that you might like to have an outstanding crowd like this called to your attention."

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QUALITY ELECTRIC STEEL CASTINGS

Protect yourself on a tie up for the post-war boom with a foundry that has proved itself through the years and is getting even more valuable experience in war work. Call us.

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FOUNDRY & MACHINE CO.

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always when you use

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SURWEL Clinograph	H-K Single Shot
SYFO Clinograph	M-M-O Bottom Hole Orientation
E-C Inclinometer	K-K Whipstock
H-K Inclinometer	Polar Core Orientation

SPERRY-SUN WELL SURVEYING CO.

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Every **WISCONSIN HEAVY-DUTY AIR-COOLED ENGINE**

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DROP FORGED CRANK-SHAFT

All Wisconsin Air-Cooled Engines are equipped with an exceptionally rugged, oversize crankshaft (as compared with other engines of comparable size)... drop-forged for maximum molecular compactness and ability to withstand the terrific pounding to which this vital unit is subjected in heavy-duty service.

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M & M BLDG., HOUSTON, TEXAS

OIL FIELD DISTRIBUTOR FOR WISCONSIN ENGINES AND ALL TYPES OF UTILITY UNITS

OIL WELL IMPROVEMENTS CO.

Pioneer creator and manufacturer of drilling and producing equipment has been in the

FIRST LINE

of the Oil Industry's

Production Front

Now . . .

OWI products are serving in the

FIRST LINE

of the Navy's

Destruction Front

Orbit Geared Master Valve

And while most of our production facilities are devoted to vital production for our fighting Navy, we will continue to furnish Orbit Valves to the Oil Industry to the limit of our ability.

If you have any questions regarding the care and maintenance of your Orbit Valves, write us.

OIL WELL IMPROVEMENTS CO.

TULSA, OKLAHOMA

Men in the Industry's News

D. A. CANT is the new chairman of the Mid-Continent Section of the American Society of Mechanical Engineers. Other officers are R. A. Colgin, Carl Stevens, John Keyes and Nathan Janco.

PAUL BENEDUM, Houston, has been commissioned a major in the Army Air Force and will be stationed in Los Angeles where he will be in charge of the aviation fuels branch in the West Coast area.

GEORGE W. PRYOR, senior petroleum engineer at Shreveport for the Louisiana Department of Conservation, has resigned to go with Big West Drilling Company at Lisbon, Louisiana.

D. L. BLACKSTONE has been named assistant geologist of the Northern Division of The Carter Oil Company, with headquarters at Billings, Montana.

WALTER CRANDALL, engineer, Sinclair Prairie Oil Company, has been transferred from Oklahoma City to Tulsa as division engineer. He is succeeded at Oklahoma City by V. B. Bottoms.

DR. FREDERICK H. HARBISON, labor counsellor to PAW, spoke in Houston April 27, in a closed meeting, to a group from the petroleum industry. His talk was for the purpose of discussing plans being formulated by PAW to assist the industry in the critical manpower situation. A similar meeting was held in Fort Worth on April 29.

W. C. MacMILLAN has been appointed manager of Continental Oil Company's production and drilling department east of the Rocky Mountains. He succeeds J. G. Dyer, vice president, who has resigned effective May 1 to become associated with a Denver oil production company.

W. L. Kygar and R. W. French have been named assistant managers of the production and drilling department. Kygar was formerly assistant to Dyer, while French has been production engineer for Continental's California division, with headquarters in Los Angeles. M. H. Shanahan, who has been assistant manager of the department, will continue in the same capacity.

MacMillan, formerly manager of Continental's Northern region of the land department, is succeeded by W. E. Haggard, who has been manager of the Southern region of the land department, headquartering at Houston. A. K. Tyson, who has been division geologist at Houston, has been named to replace Haggard. Coincident with these changes the oil pipe line and terminal division, the telephone and telegraph division, and the oil trading division, have been designated as the pipe line department, with A. C. Wilkinson as manager. D. W. Sims, formerly superintendent of the telephone and telegraph division, has been appointed assistant manager. T. A. Van Griethuysen, formerly superintendent of the oil trading division, has been named assistant manager in charge of oil trading.

MacMillan has been associated with Continental Oil Company for 15 years. He was born at Williamstown, Massachusetts, and attended Brown University,

W. C. MacMillan

J. G. Dyer

Providence, Rhode Island. He joined Continental as an instrument man in the geological department, and through successive promotions became a lease man, assistant superintendent of the land division, assistant manager, and was named manager of the Northern region of the land department in September, 1938.

HARRY WHEELDON, assistant superintendent of natural gasoline plants for Lone Star Producing Company, Dallas, has been promoted to superintendent, succeeding the late J. R. Jarvis. Fred Townsend, superintendent of plants in the East Texas district, has been transferred to Dallas as assistant superintendent.

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